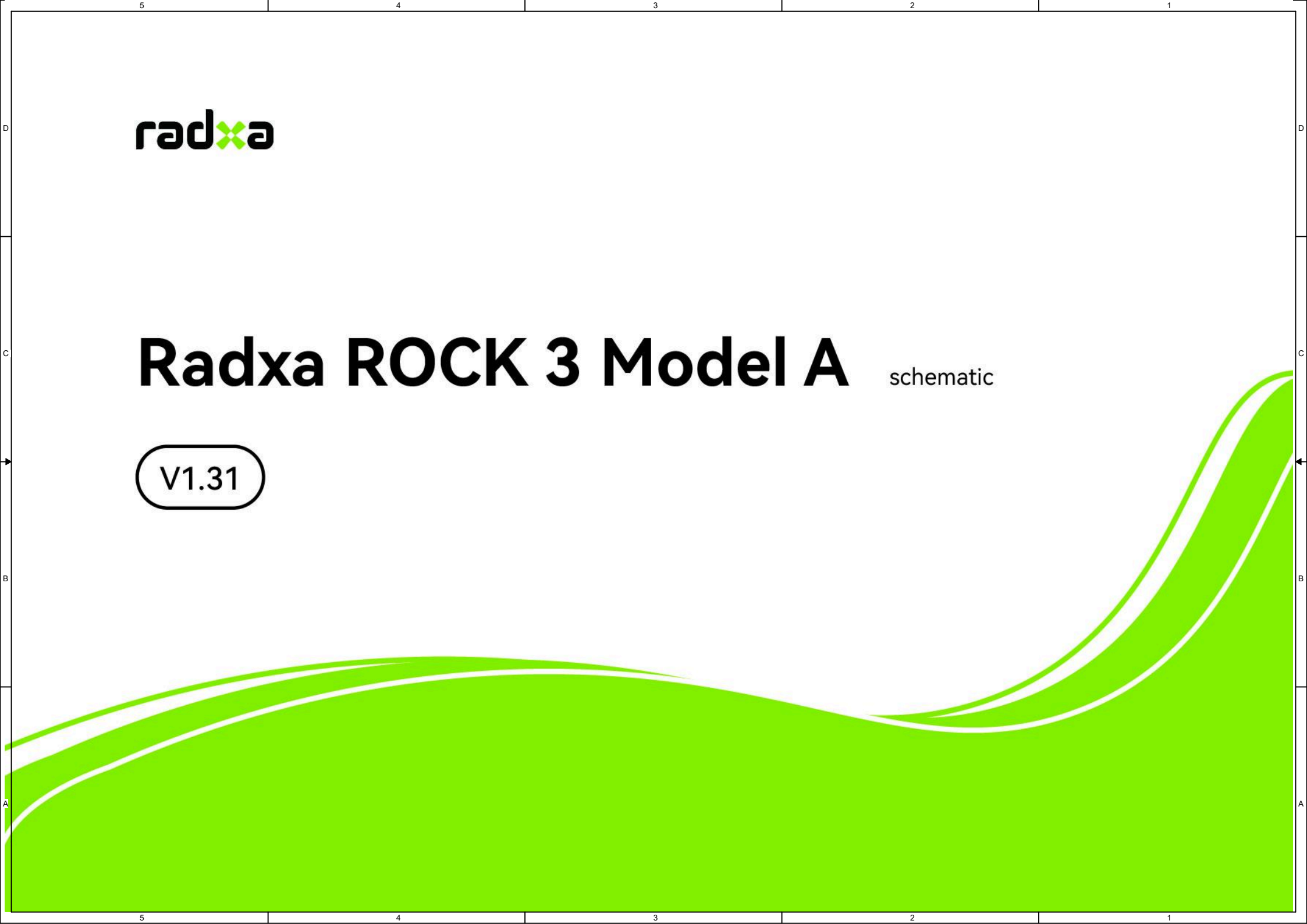




# Radxa ROCK 3 Model A

schematic

V1.31



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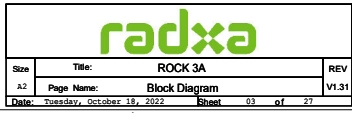
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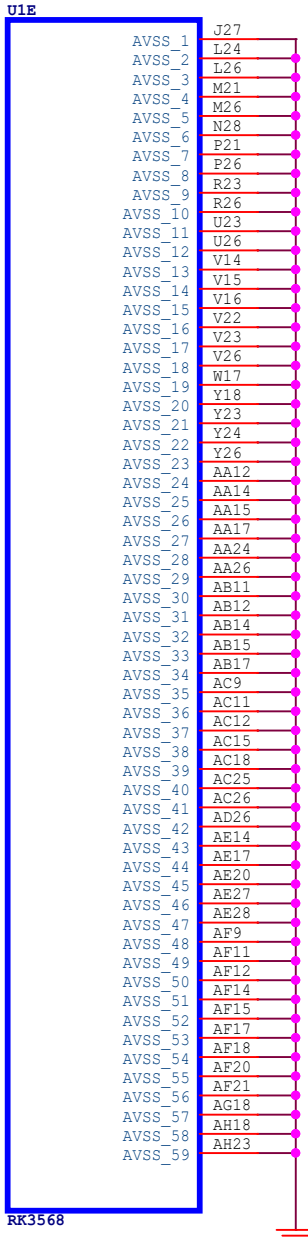
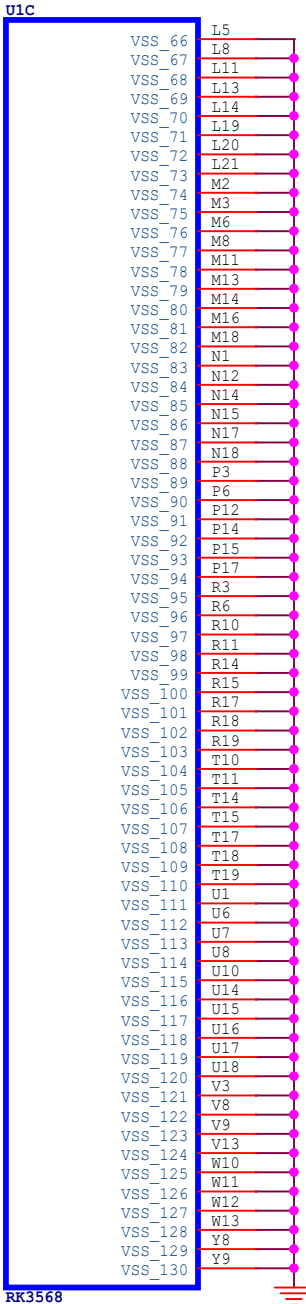
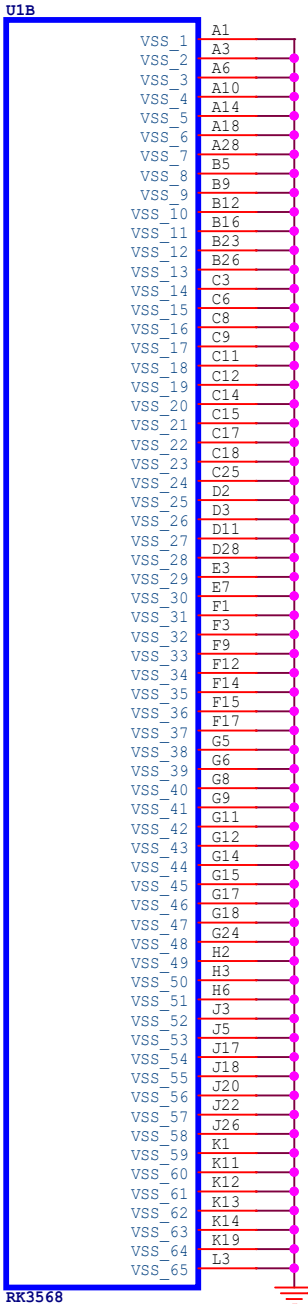
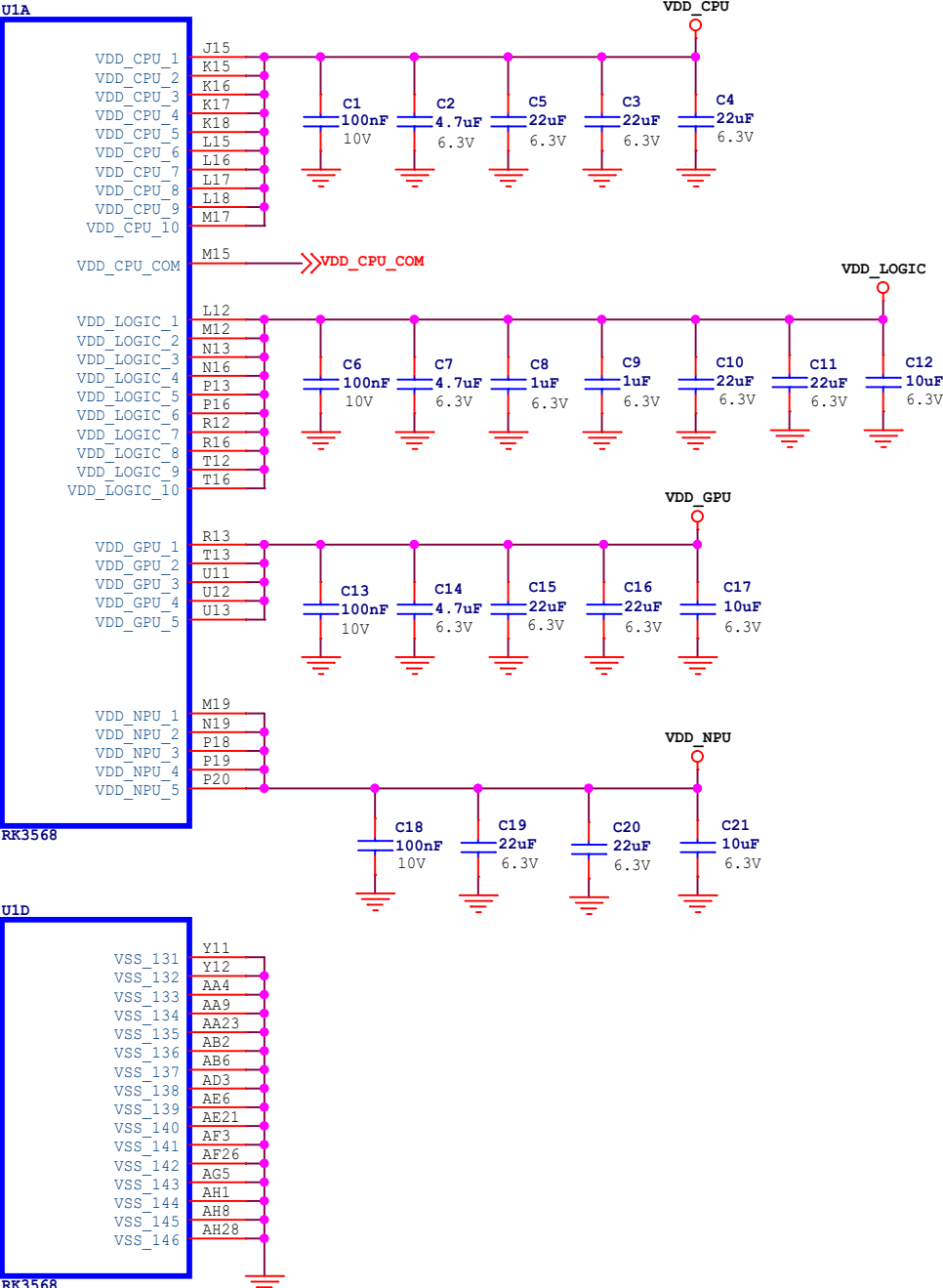
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|---------------------------------|------------------|-------|
| Size                            | Title: ROCK 3A   | REV   |
| A4                              | Page Name: Index | V1.31 |
| Date: Tuesday, October 18, 2022 | Sheet 02 of 27   |       |

The diagram illustrates the connections for the **RK809-5 PMIC+Codec** integrated circuit. The connections are as follows:

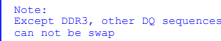
- Power Input:** A **PD/QC Adapter** (represented by a USB-C symbol) provides power to a **DC/DC** converter. The output of the DC/DC converter is a **3.3V** supply connected to the top of the RK809-5 chip.
- Power Key:** A **Power Key** (represented by a power button symbol) is connected to the bottom of the RK809-5 chip.
- Crystal:** A **32.768KHz** crystal is connected to the top of the RK809-5 chip.
- Outputs:**
  - SKP OUT:** Connected to a microphone icon.
  - MIC:** Connected to a microphone icon.
  - HP OUT:** Connected to a headphone icon.
- Control Signals:**
  - I2S1:** A bidirectional connection to the right.
  - 32.768KHz OUT:** A bidirectional connection to the right.
  - I2C0/Sleep/INT:** A bidirectional connection to the right.
  - RESETn:** A connection to the right.
- Power for RK3568:** A large red arrow indicates power being supplied from the top of the RK809-5 chip to the right, labeled "Power for RK3568".



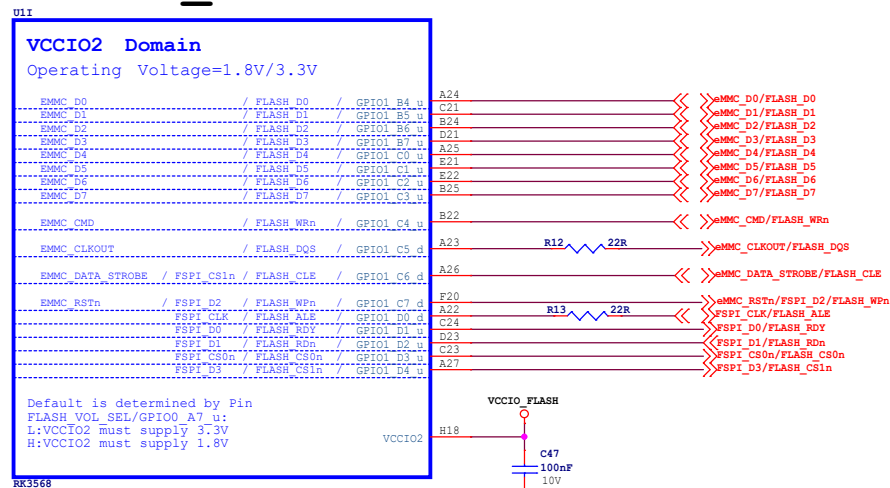
# RK3568\_ABCDE (Power&Gnd)



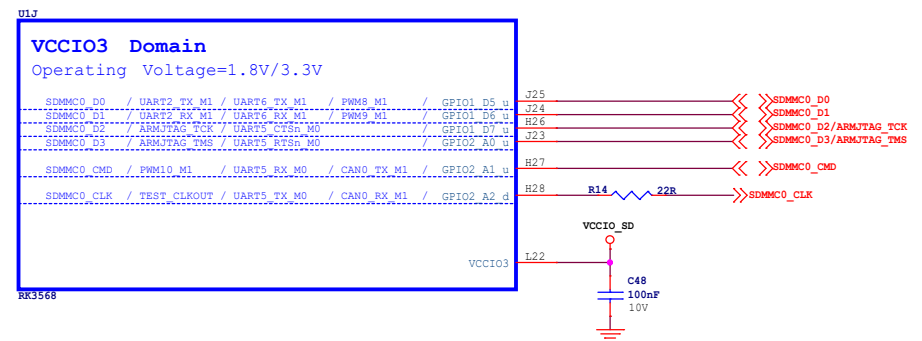
U1F



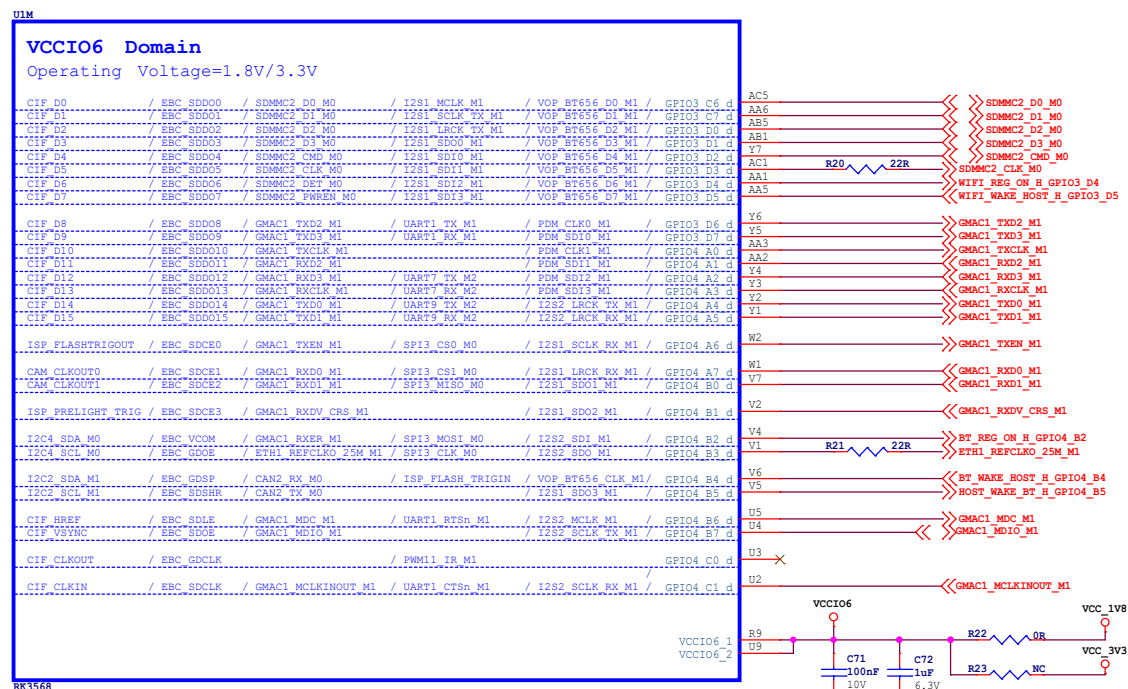
## RK3568\_I (VCCIO2 Domain)



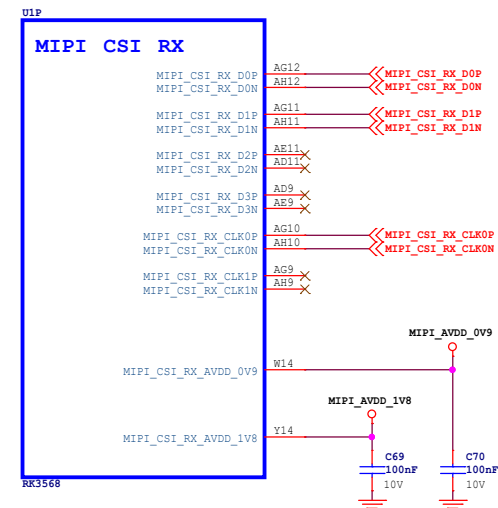
## RK3568\_J (VCCIO3 Domain)



## RK3568\_M (VCCIO6 Domain)



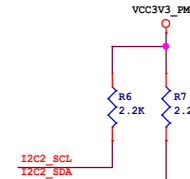
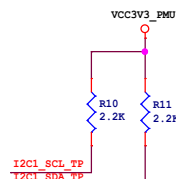
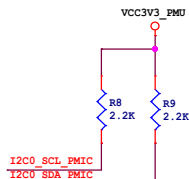
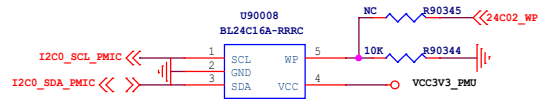
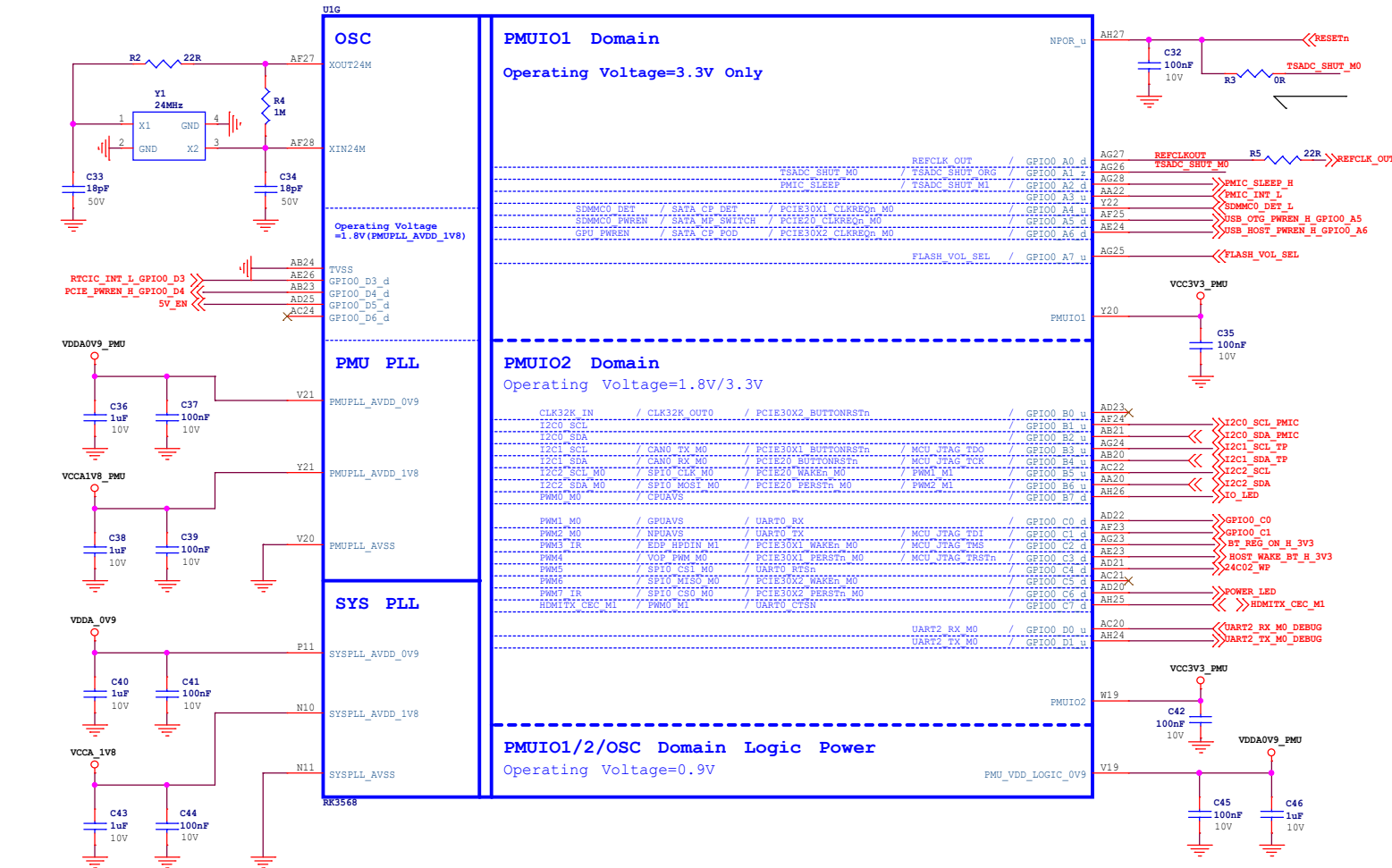
## RK3568\_P (MIPI\_CSI\_RX)



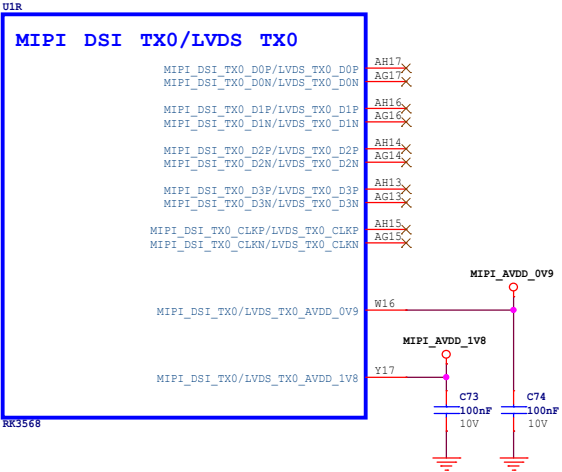
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| Size  | Title:                                 | REV            |
|-------|----------------------------------------|----------------|
| A3    | Page Name: RK3568_EMMC/FSPI/GMAC1/MIPI | V1.31          |
| Date: | Tuesday, October 18, 2022              | Sheet 06 of 27 |

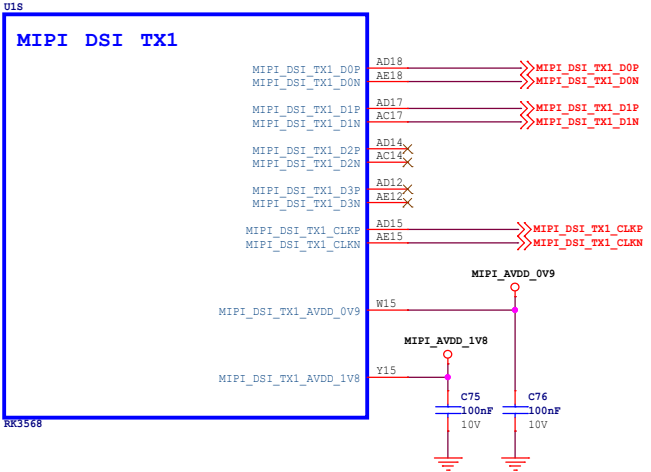
# RK3568\_G (OSC/PLL/PMUIO1/2)



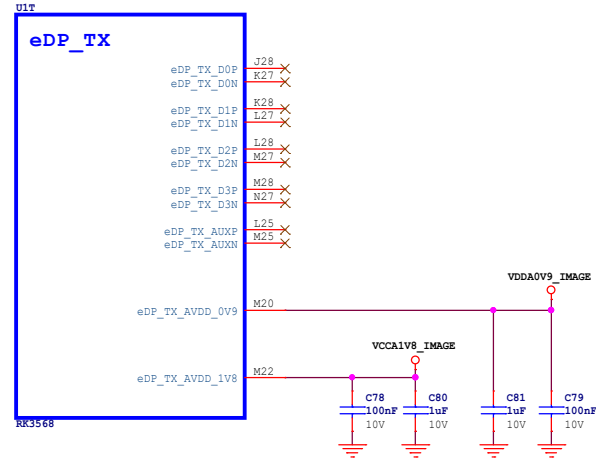
RK3568\_R(MIPI\_DSI\_TX0/LVDS\_TX0)



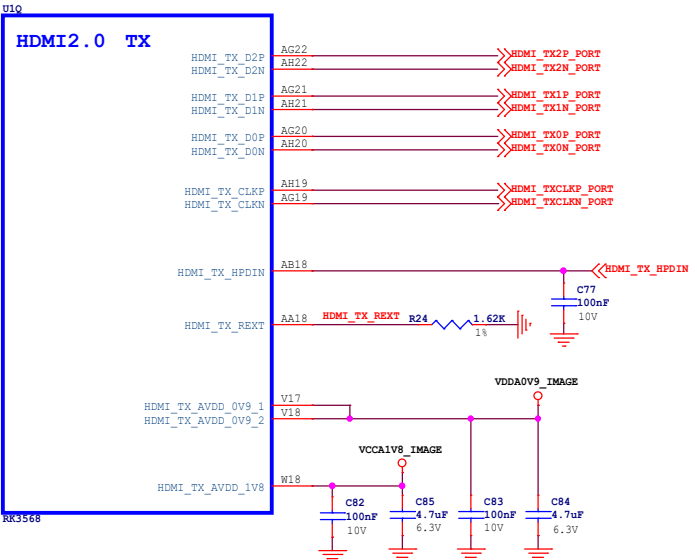
RK3568\_S(MIPI\_DSI\_TX1)



RK3568\_T(eDP TX)



RK3568\_Q(HDMI2.0 TX)



# RK3568\_L (VCCIO5 Domain)

U1L

## VCCIO5 Domain

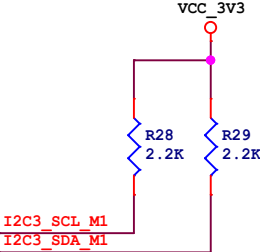
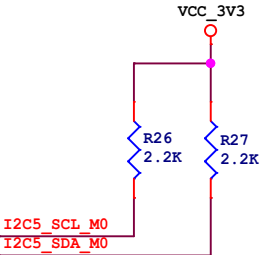
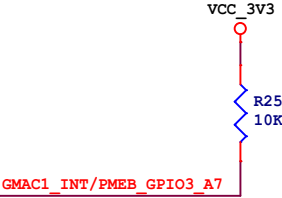
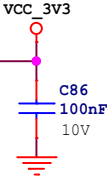
Operating Voltage=1.8V/3.3V

|             |                    |                       |                       |                   |              |
|-------------|--------------------|-----------------------|-----------------------|-------------------|--------------|
| LCDC D0     | / VOP BT656 D0 M0  | / SPI0 MISO M1        | / PCIE20 CLKREQn M1   | / I2S1 MCLK M2    | / GPIO2 D0 d |
| LCDC D1     | / VOP BT656 D1 M0  | / SPI0 MOSI M1        | / PCIE20 WAKEN M1     | / I2S1 SCLK TX M2 | / GPIO2 D1 d |
| LCDC D2     | / VOP BT656 D2 M0  | / SPI0 CS0 M1         | / PCIE30X1 CLKREQn M1 | / I2S1 LRCK TX M2 | / GPIO2 D2 d |
| LCDC D3     | / VOP BT656 D3 M0  | / SPI0 CLK M1         | / PCIE30X1 WAKEN M1   | / I2S1 SDIO M2    | / GPIO2 D3 d |
| LCDC D4     | / VOP BT656 D4 M0  | / SPI2 CS1 M1         | / PCIE30X2 CLKREQn M1 | / I2S1 SDI1 M2    | / GPIO2 D4 d |
| LCDC D5     | / VOP BT656 D5 M0  | / SPI2 CS0 M1         | / PCIE30X2 WAKEN M1   | / I2S1 SDI2 M2    | / GPIO2 D5 d |
| LCDC D6     | / VOP BT656 D6 M0  | / SPI2 MOSI M1        | / PCIE30X2 PERSTn M1  | / I2S1 SDI3 M2    | / GPIO2 D6 d |
| LCDC D7     | / VOP BT656 D7 M0  | / SPI2 MISO M1        | / UART8 TX M1         | / I2S1 SDO0 M2    | / GPIO2 D7 d |
| LCDC CLK    | / VOP BT656 CLK M0 | / SPI2 CLK M1         | / UART8 RX M1         | / I2S1 SDO1 M2    | / GPIO3 A0 d |
| LCDC D8     | / VOP BT1120 D0    | / SPI1 CS0 M1         | / PCIE30X1 PERSTn M1  | / SDMMC2 D0 M1    | / GPIO3 A1 d |
| LCDC D9     | / VOP BT1120 D1    | / GMAC1 TXD2 M0       | / I2S3 MCLK M0        | / SDMMC2 D1 M1    | / GPIO3 A2 d |
| LCDC D10    | / VOP BT1120 D2    | / GMAC1 TXD3 M0       | / I2S3 SCLK M0        | / SDMMC2 D2 M1    | / GPIO3 A3 d |
| LCDC D11    | / VOP BT1120 D3    | / GMAC1 RXD2 M0       | / I2S3 LRCK M0        | / SDMMC2 D3 M1    | / GPIO3 A4 d |
| LCDC D12    | / VOP BT1120 D4    | / GMAC1 RXD3 M0       | / I2S3 SDO M0         | / SDMMC2 CMD M1   | / GPIO3 A5 d |
| LCDC D13    | / VOP BT1120 CLK   | / GMAC1 TXCLK M0      | / I2S3 SDI M0         | / SDMMC2 CLK M1   | / GPIO3 A6 d |
| LCDC D14    | / VOP BT1120 D5    | / GMAC1 RXCLK M0      | / SDMMC2 DET M1       | / GPIO3 A7 d      |              |
| LCDC D15    | / VOP BT1120 D6    | / ETH1 REFCLK0 25M M0 |                       | / SDMMC2 PWREN M1 | / GPIO3 B0 d |
| LCDC D16    | / VOP BT1120 D7    | / GMAC1 RXD0 M0       | / UART4 RX M1         | / PWM8 M0         | / GPIO3 B1 d |
| LCDC D17    | / VOP BT1120 D8    | / GMAC1 RXD1 M0       | / UART4 TX M1         | / PWM9 M0         | / GPIO3 B2 d |
| LCDC D18    | / VOP BT1120 D9    | / GMAC1 RXDV CRS M0   | / I2C5_SCL M0         | / PDM SDIO M2     | / GPIO3 B3 d |
| LCDC D19    | / VOP BT1120 D10   | / GMAC1 RXER M0       | / I2C5_SDA M0         | / PDM SDI1 M2     | / GPIO3 B4 d |
| LCDC D20    | / VOP BT1120 D11   | / GMAC1 TXD0 M0       | / I2C3_SCL M1         | / PWM10 M0        | / GPIO3 B5 d |
| LCDC D21    | / VOP BT1120 D12   | / GMAC1 TXD1 M0       | / I2C3_SDA M1         | / PWM11 IR M0     | / GPIO3 B6 d |
| LCDC D22    | / PWM12 M0         | / GMAC1 TXEN M0       | / UART3 TX M1         | / PDM SDI2 M2     | / GPIO3 B7 d |
| LCDC D23    | / PWM13 M0         | / GMAC1 MCLKINOUT M0  | / UART3 RX M1         | / PDM SDI3 M2     | / GPIO3 C0 d |
| LCDC HSYNC  | / VOP BT1120 D13   | / SPI1 MOSI M1        | / PCIE20 PERSTn M1    | / I2S1 SDO2 M2    | / GPIO3 C1 d |
| LCDC VSYNC  | / VOP BT1120 D14   | / SPI1 MISO M1        | / UART5 TX M1         | / I2S1 SDO3 M2    | / GPIO3 C2 d |
| LCDC DEN    | / VOP BT1120 D15   | / SPI1 CLK M1         | / UART5 RX M1         | / I2S1 SCLK RX M2 | / GPIO3 C3 d |
| PWM14 M0    | / VOP PWM M1       | / GMAC1 MDC M0        | / UART7 TX M1         | / PDM CLK1 M2     | / GPIO3 C4 d |
| PWM15 IR M0 | / SPDIF TX M1      | / GMAC1 MDIO M0       | / UART7 RX M1         | / I2S1 LRCK RX M2 | / GPIO3 C5 d |

RK3568

VCCIO5\_1  
VCCIO5\_2

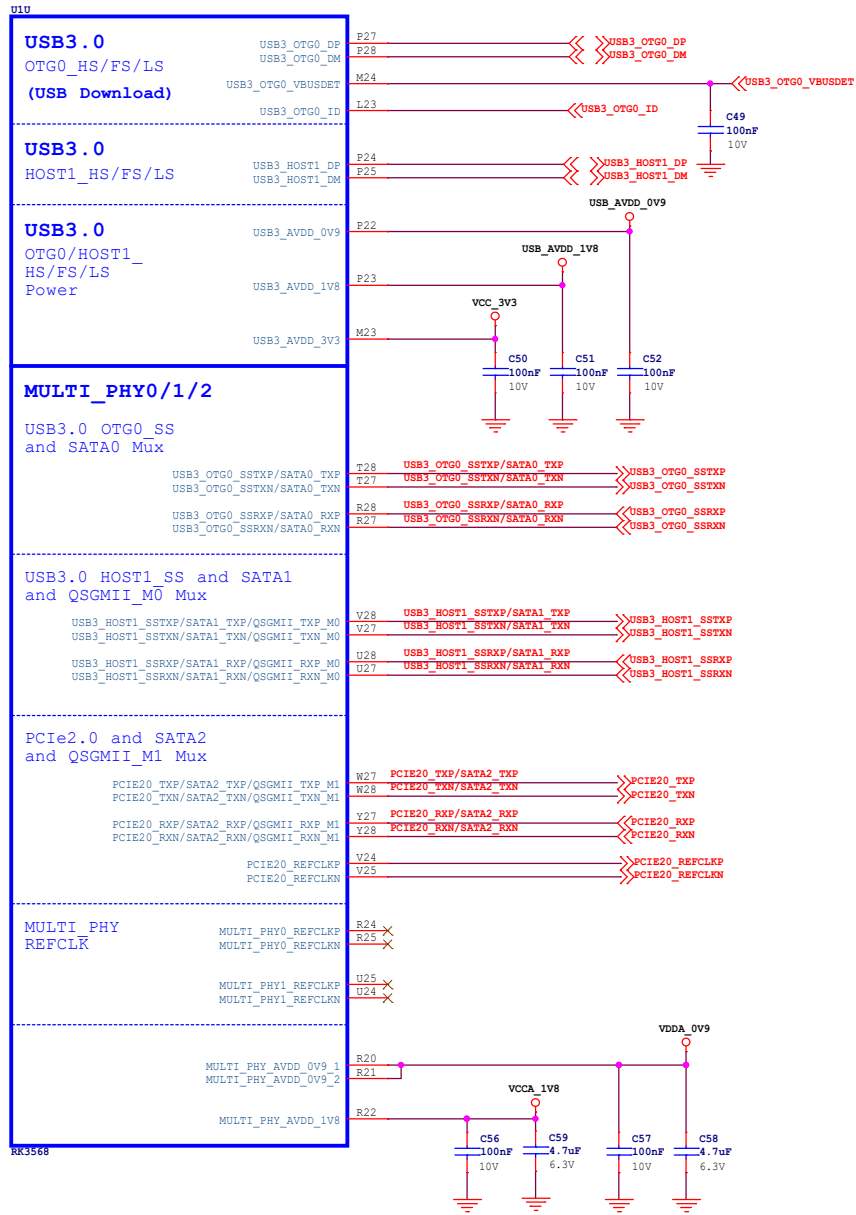
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|-----|----------------------------|
| AG6 | >> PCIE20_CLKREQn_M1       |
| AD7 | >> PCIE20_WAKEn_M1         |
| AC8 | >> HP_DET_L_GPIO2_D2       |
| AC7 | >> GMAC1_INT/PMEB_GPIO3_A7 |
| AF5 | >> PCIE30X2_CLKREQn_M1     |
| AF6 | >> PCIE30X2_WAKEn_M1       |
| AD6 | >> PCIE30X2_PERSTn_M1      |
| AH5 | >> GPIO2_D7                |
| AH4 | >> GPIO3_A0                |
| AB8 | >> GPIO3_A2                |
| AE5 | >> GPIO3_A3                |
| AG4 | >> GPIO3_A4                |
| AF4 | >> GPIO3_A5                |
| AH3 | >> GPIO3_A6                |
| AG3 | >> GMAC1_INT/PMEB_GPIO3_A7 |
| AH2 | >> GMAC1_RSTn_GPIO3_B0     |
| AG2 | >> GMAC1_RSTn_GPIO3_B0     |
| AG1 | >> PWM_FAN                 |
| AF2 | >> GPIO3_B2                |
| AF1 | >> I2C5_SCL_M0             |
| AE1 | >> I2C5_SDA_M0             |
| AE2 | >> I2C3_SCL_M1             |
| AE3 | >> I2C3_SDA_M1             |
| AD4 | >> LCD0_PWREN_H_GPIO3_C0   |
| AD2 | >> LCD0_PWREN_H_GPIO3_C0   |
| AD1 | >> PCIE20_PERSTn_M1        |
| AA7 | >> GPIO3_C2                |
| AC4 | >> GPIO3_C3                |
| AC3 | >> GPIO3_C4                |
| AC2 | >> GPIO3_C5                |



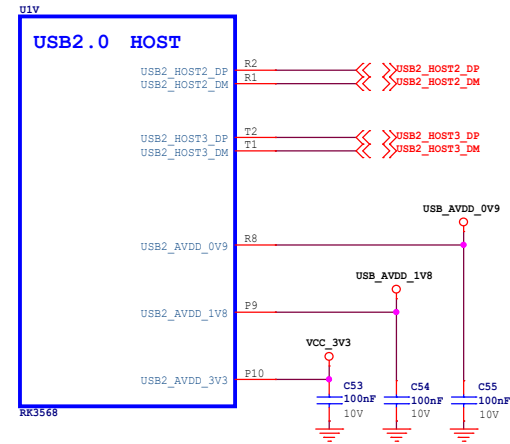
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|                                 |                           |       |
|---------------------------------|---------------------------|-------|
| Size                            | Title: ROCK 3A            | REV   |
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| Date: Tuesday, October 18, 2022 | Sheet 09 of 27            |       |

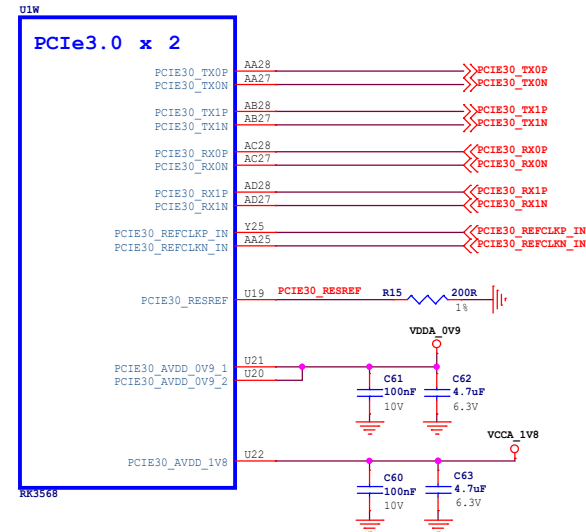
# RK3568\_U (USB3.0/SATA/QSGMII/PCIE2.0 x1)



# RK3568\_V (USB2.0 HOST)



# RK3568\_W (PCIE3.0 x2)



radxa

**VCCIO4 Domain**  
Operating Voltage=1.8V/3.3V

|                 |                   |                |                |     |                 |
|-----------------|-------------------|----------------|----------------|-----|-----------------|
| SDMMC1_D0       | / GMACO_RXD2      | / UART6_RX_M0  | / GPIO2_A3_u   | E27 | ✗               |
| SDMMC1_D1       | / GMACO_RXD3      | / UART6_TX_M0  | / GPIO2_A4_u   | E28 | ✗               |
| SDMMC1_D2       | / GMACO_RXCLK     | / UART7_RX_M0  | / GPIO2_A5_u   | B28 | ✗               |
| SDMMC1_D3       | / GMACO_TXD2      | / UART7_TX_M0  | / GPIO2_A6_u   | C27 | ✗               |
| SDMMC1_CMD      | / GMACO_TXD3      | / UART9_RX_M0  | / GPIO2_A7_u   | C28 | ✗               |
| SDMMC1_CLK      | / GMACO_TXCLK     | / UART9_TX_M0  | / GPIO2_B0_d   | D27 |                 |
| SDMMC1_PWREN    | I2C4_SDA_M1       | / UART5_RTS_M0 | / CAN2_RX_M1   | D26 | »» I2C4_SDA_M1  |
| SDMMC1_RST      | I2C4_SCL_M1       | / CAN2_TX_M1   | / GPIO2_B2_u   | E26 | »» I2C4_SCL_M1  |
|                 | GMACO_TXD0        | / UART1_RX_M0  | / GPIO2_B3_u   | F28 | »» UART1_RX_M0  |
|                 | GMACO_TXD1        | / UART1_TX_M0  | / GPIO2_B4_u   | G28 | »» UART1_TX_M0  |
|                 | GMACO_TXEN        | / UART1_RTS_M0 | / SPI1_CLK_M0  | E27 | »» UART1_RTS_M0 |
|                 | GMACO_RXD0        | / UART1_CTS_M0 | / SPI1_MISO_M0 |     | »» UART1_CTS_M0 |
| I2S2_SCLK_RX_M0 | / GMACO_RXD1      | / UART6_RTS_M0 | / SPI1_MOSI_M0 | H25 | ✗               |
| I2S2_LRCK_RX_M0 | / GMACO_RXDV_CBS  | / UART6_CTS_M0 | / SPI1_CS0_M0  | F24 | ✗               |
| I2S2_MCLK_M0    | ETH0_RXCLK0_25M   | / UART7_RTS_M0 | / SPI2_CLK_M0  | G23 | ✗               |
| I2S2_SCLK_TX_M0 | / GMACO_MCLKINOUT | / UART7_CTS_M0 | / SPI2_MISO_M0 | F25 |                 |
| I2S2_LRCK_TX_M0 | / GMACO_MCLK      | / UART8_CTS_M0 | / SPI2_MOSI_M0 | H24 | »» SOC_PCM_CLK  |
| I2S2_SDO_M0     | / GMACO_MDO       | / UART8_CTS_M0 | / SPI2_CS0_M0  | H23 | »» SOC_PCM_SYNC |
| I2S2_SDI_M0     | / GMACO_RXER      | / UART8_TX_M0  | / SPI2_CS1_M0  | F26 | »» SOC_PCM_OUT  |
| CLK32K_OUT1     |                   | / UART8_RX_M0  | / SPI1_CS1_M0  | E26 | ✗               |

VCC1V8

J21

C64  
100nF  
10V

VCCIO4

**VCCIO7 Domain**  
Operating Voltage=1.8V/3.3V

|               |                |                 |                       |                |              |      |                                 |
|---------------|----------------|-----------------|-----------------------|----------------|--------------|------|---------------------------------|
| PMW14 M1      | / SPI3 CLK M1  | / CAN1 RX M1    | / PCIE30X2_CLKREQ0 M2 | / I2S3 MCLK M1 | / GPIO4_C2_d | AF8  | >>> GPIO4_C2                    |
| PMW15 TX M1   | / SPI3 MISO M1 | / CAN1 TX M1    | / PCIE30X2_WARE0 M2   | / I2S3 SCLK M1 | / GPIO4_C2_u | AA11 | >>> GPIO4_C3                    |
| SDP_HDMI0 M0  | / SPI3 TX M2   | / SATA0 ACT_LED | / PCIE30X2_HRESET M2  | / I2S3 LCLK M1 | / GPIO4_C4_d | AH7  | >>> GPIO4_C4                    |
| PMW12 M1      | / SPI3 MISO M1 | / SATA0 ACT_LED | / UART9 TX M1         | / I2S3 SDO M1  | / GPIO4_C5_d | AD8  | >>> GPIO4_C5                    |
| PMW13 M1      | / SPI3 CS0 M1  | / SATA0 ACT_LED | / UART9 RX M1         | / I2S3 SDI M1  | / GPIO4_C6_d | AE8  | >>> GPIO4_C6                    |
| HDMITX_SCL    | / I2C5_SCL M1  |                 |                       |                | / GPIO4_C7_u | AG8  | >>> HDMITX_SCL                  |
| HDMITX_SDA    | / I2C5_SDA M1  |                 |                       |                | / GPIO4_D1_d | AG7  | >>> HDMITX_SDA                  |
| HDMITX_CEC M0 | / SPI3_CSI M1  |                 |                       |                | / GPIO4_D1_u | AH6  | >>> HDMITX_CEC_M0               |
|               |                |                 |                       |                | / GPIO4_D2_d | AB9  | <<< CAMERAB_PDN_L_GPIO4_D2 [26] |

VCCIO7

VCC 3V3

V12

C66  
100nF  
10V

RR3568

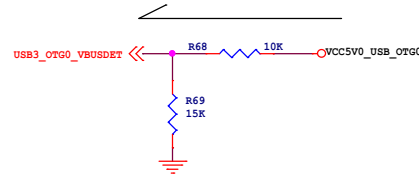
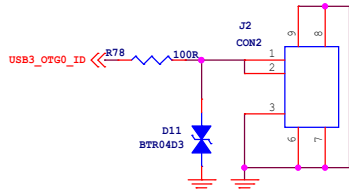
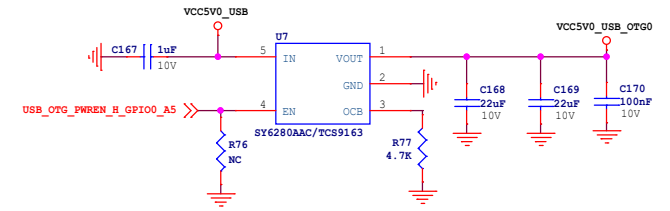
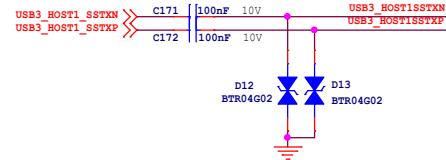
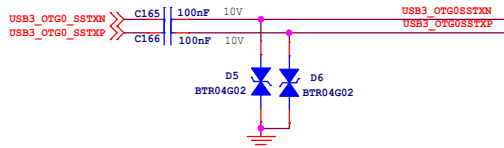
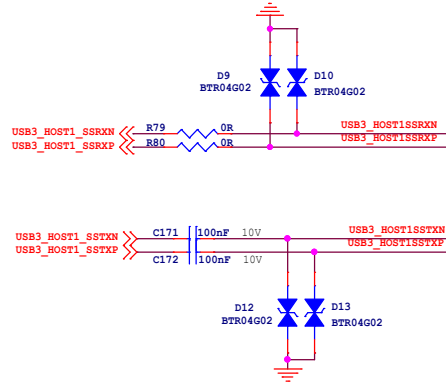
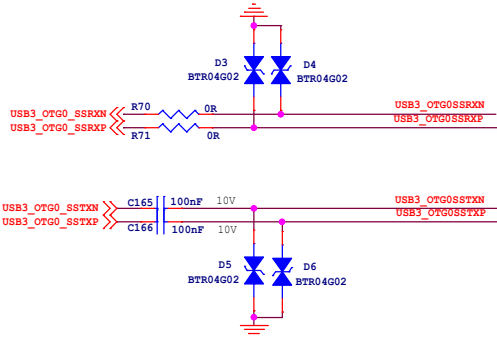
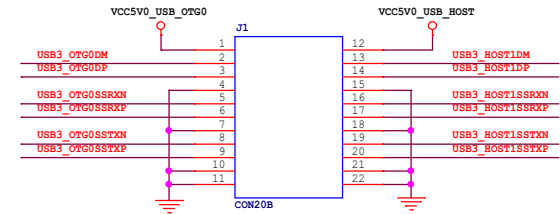
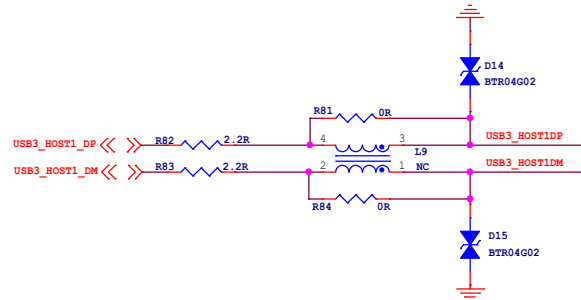
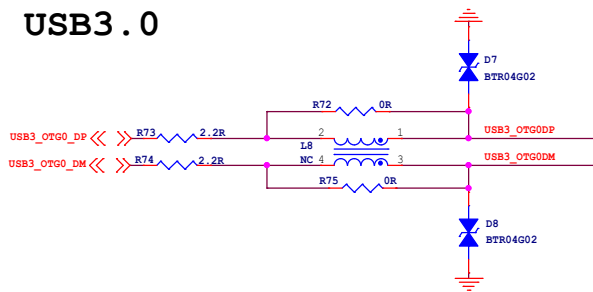
HDMITX\_CEC\_M0 R19 22R >>> GPIO4\_D1

The schematic diagram shows the internal connections for the SARADC and OTP blocks. The SARADC block has pins for Recovery/VIN0, VIN1, VIN2, VIN3, VIN4, VIN5, VIN6, and VIN7. The OTP block has pins for VCC18 and VCC18. The connections are as follows:

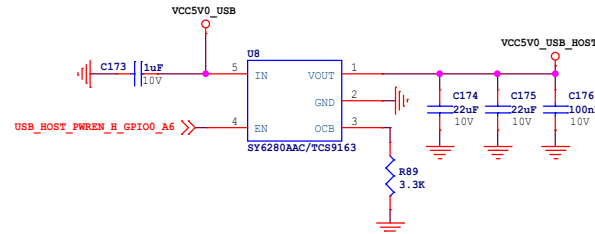
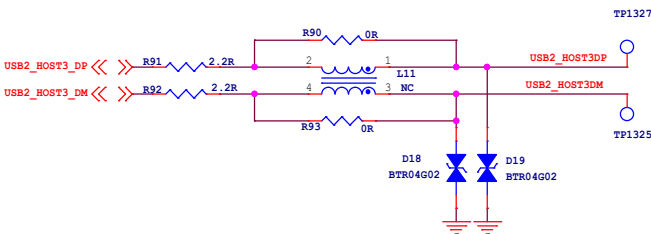
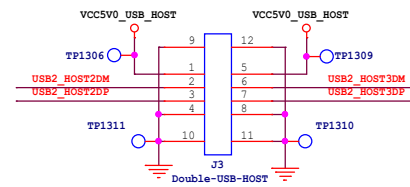
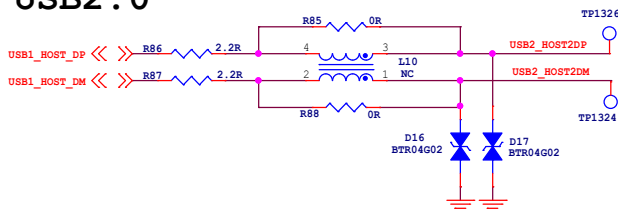
- SARADC Recovery/VIN0:** Connected to B27, which is also connected to VCCA\_1V8 through a 10K resistor (R18) and a 1nF capacitor (C65). A test point (TP6) is located at the VCCA\_1V8 supply.
- SARADC VIN1:** Connected to C26.
- SARADC VIN2:** Connected to D24, which is also connected to VCCA\_1V8 through a 10K resistor (R18) and a 1nF capacitor (C65). A test point (TP5) is located at the VCCA\_1V8 supply.
- SARADC VIN3:** Connected to E23.
- SARADC VIN4:** Connected to G21.
- SARADC VIN5:** Connected to F22.
- SARADC VIN6:** Connected to G20 (marked with an 'X').
- SARADC VIN7:** Connected to F21 (marked with an 'X').
- SARADC\_AVDD\_1V8:** Connected to H22, which is also connected to VCCA\_1V8 through a 100nF capacitor (C67) and a 10V supply.
- OTP VCC18:** Connected to H20, which is also connected to VCCA\_1V8 through a 100nF capacitor (C68) and a 10V supply.

[illegible]

## USB3.0



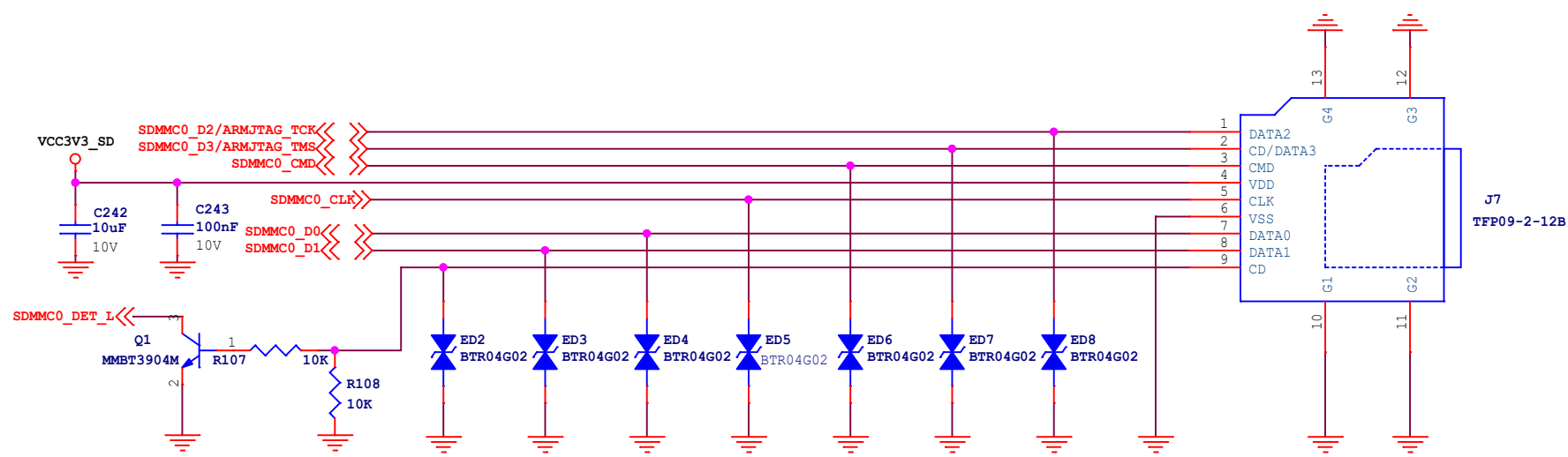
## USB2.0



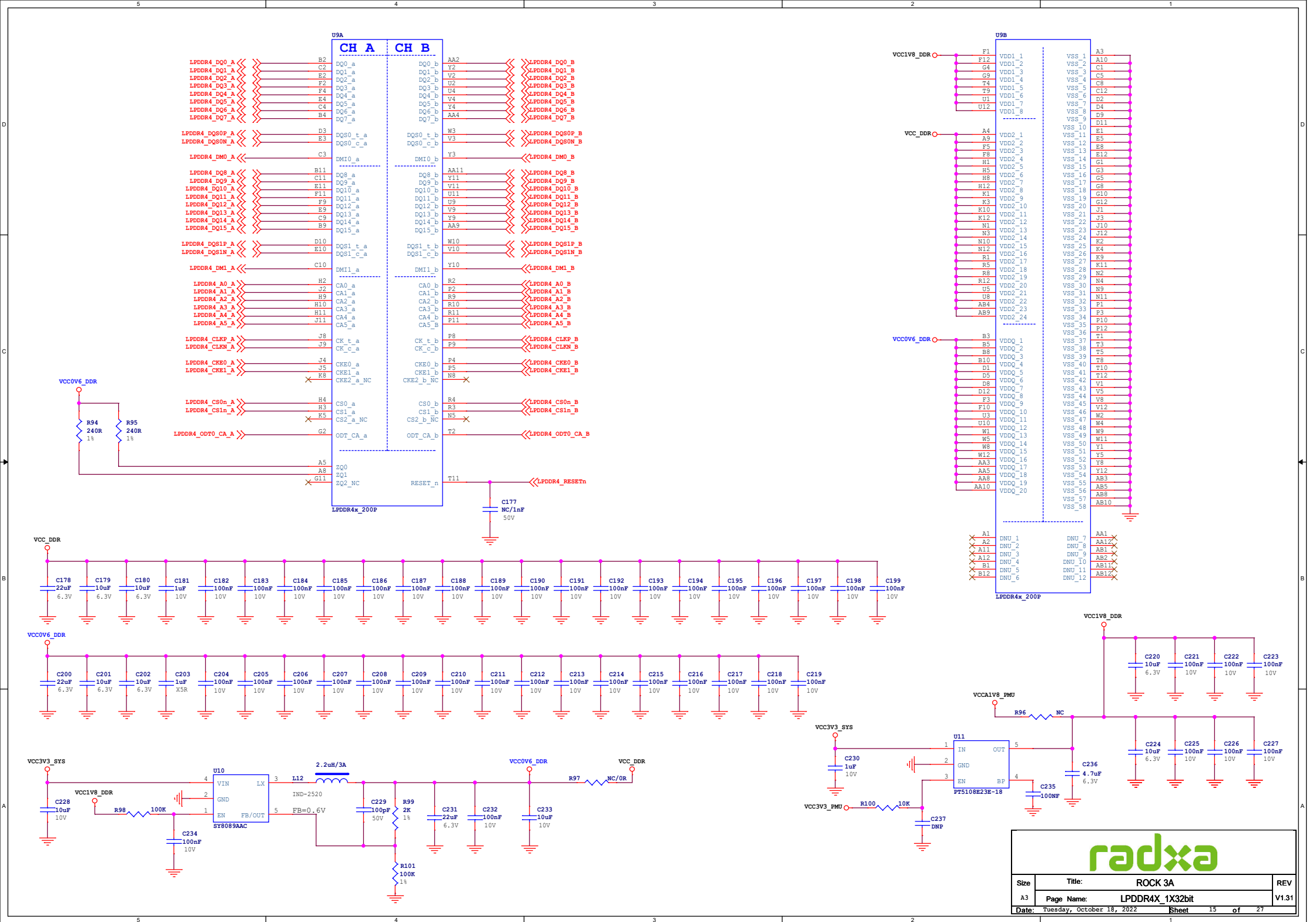
radxa

|                                 |                               |       |
|---------------------------------|-------------------------------|-------|
| Size                            | Title: ROCK 3A                | REV   |
| A3                              | Page Name: USB2.0/USB3.0 Port | V1.31 |
| Date: Tuesday, October 18, 2022 | Sheet 12 of 27                |       |

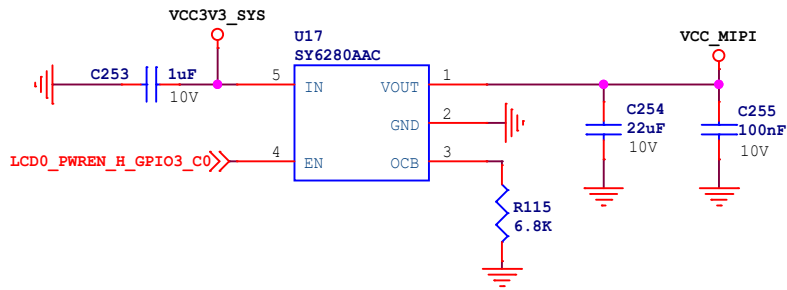
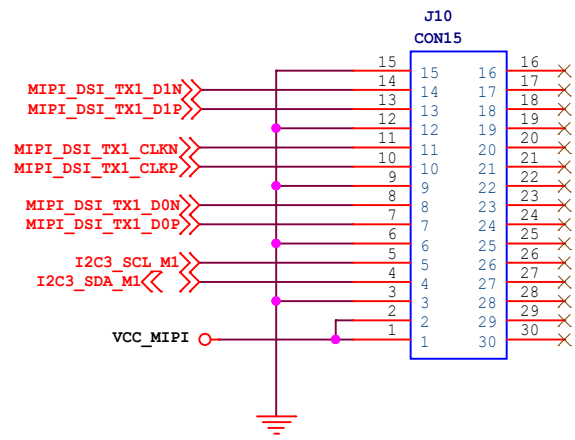
# MicroSD Card



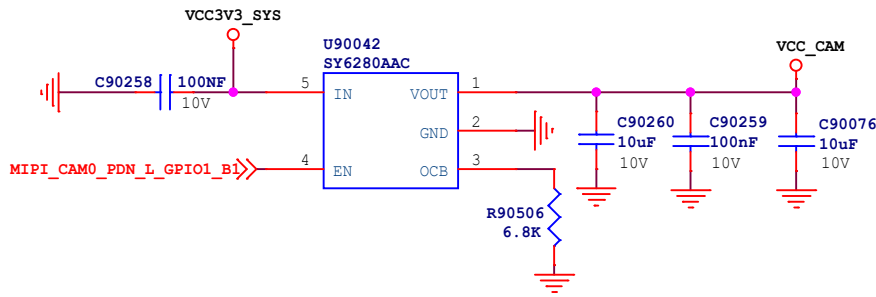
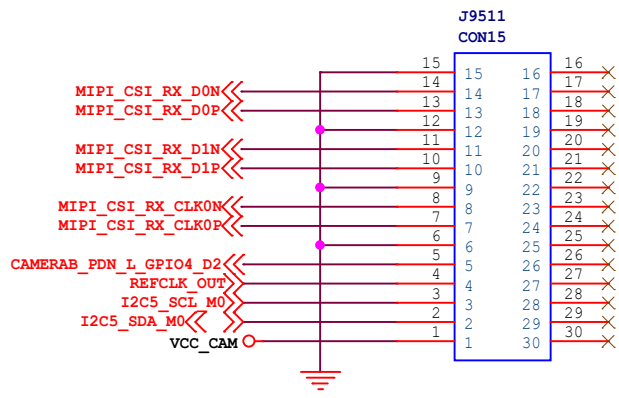




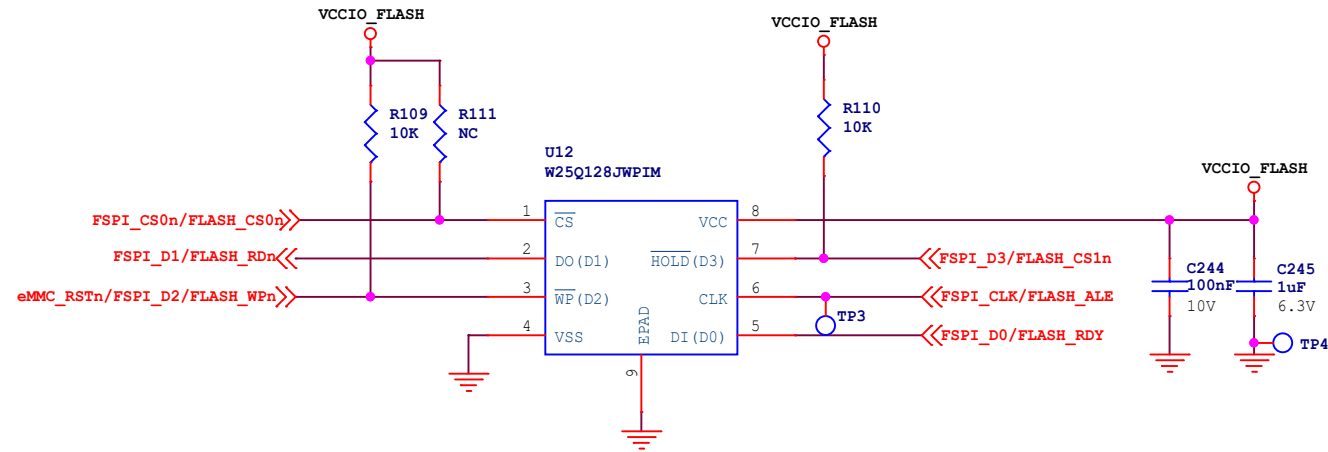
# MIPI\_DSI\_TX 2Lanes



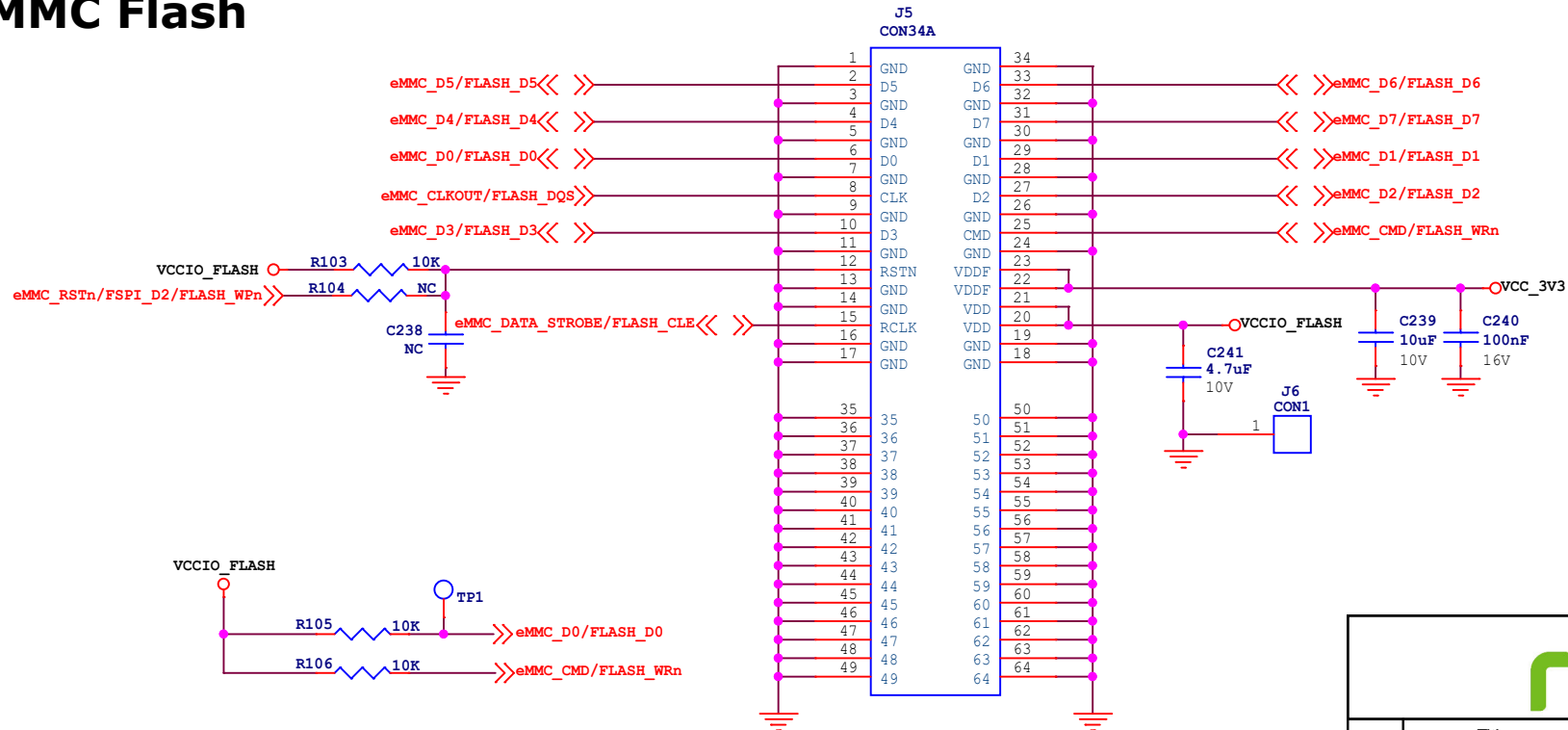
# MIPI\_CSI\_RX 2Lanes



## SPI Flash

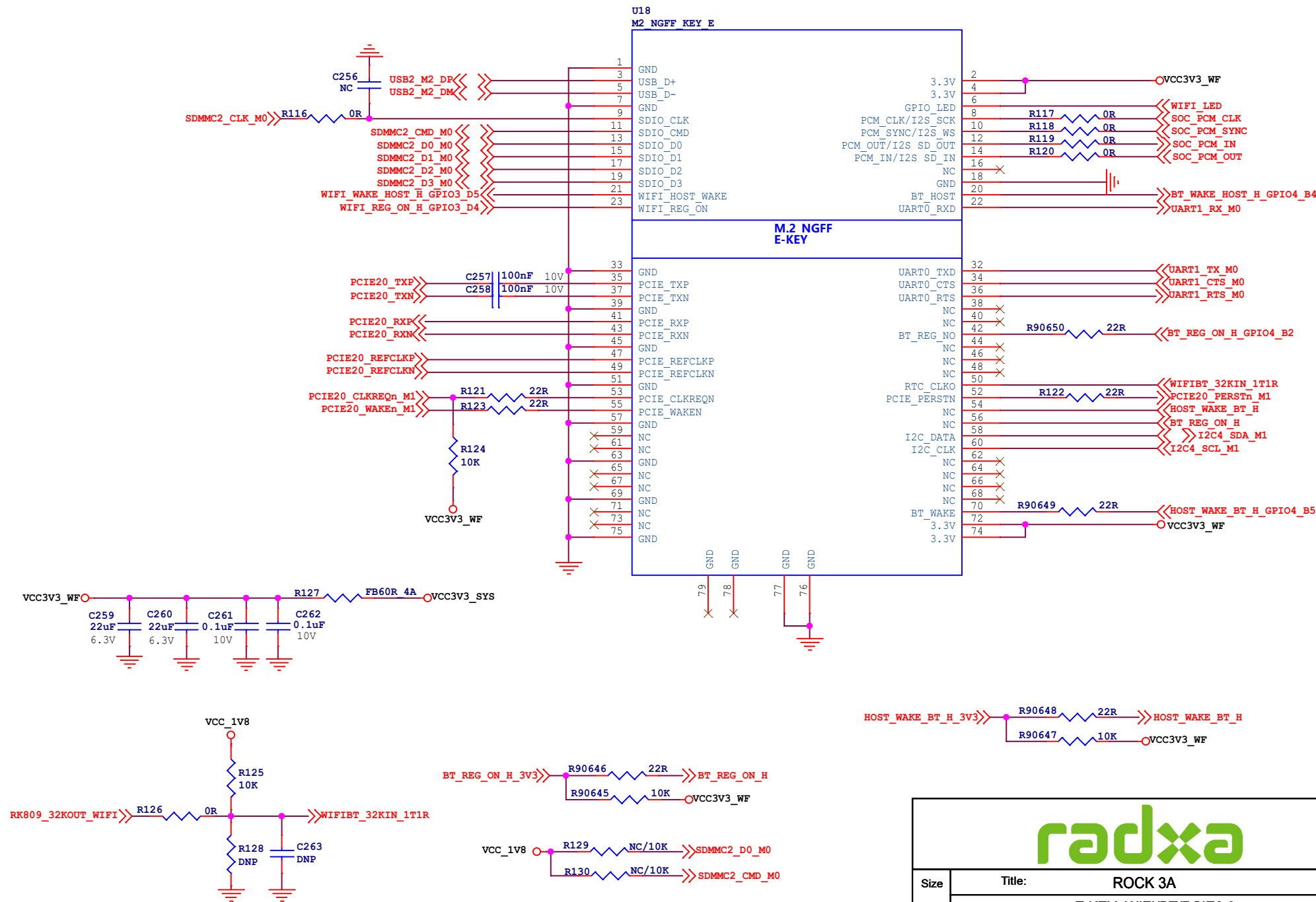


## eMMC Flash



|                                 |                                  |                |
|---------------------------------|----------------------------------|----------------|
| Size<br><br>A4                  | Title: <b>ROCK 3A</b>            | REV            |
|                                 | Page Name: <b>eMMC/SPI Flash</b> | V1.31          |
| Date: Tuesday, October 18, 2022 |                                  | Sheet 17 of 27 |

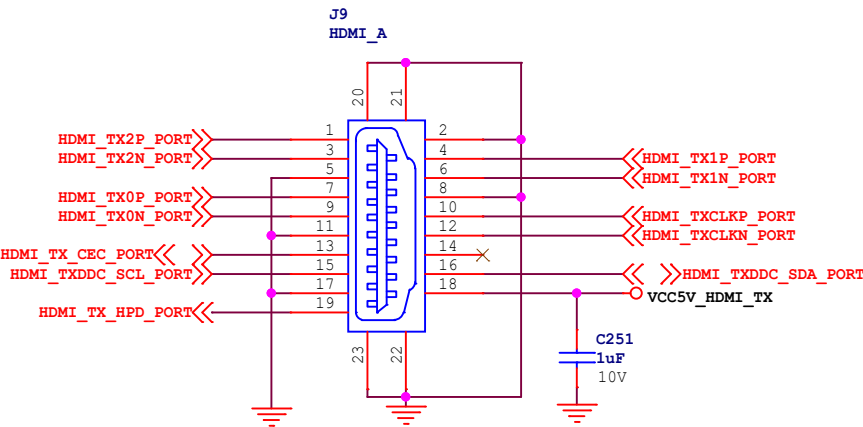
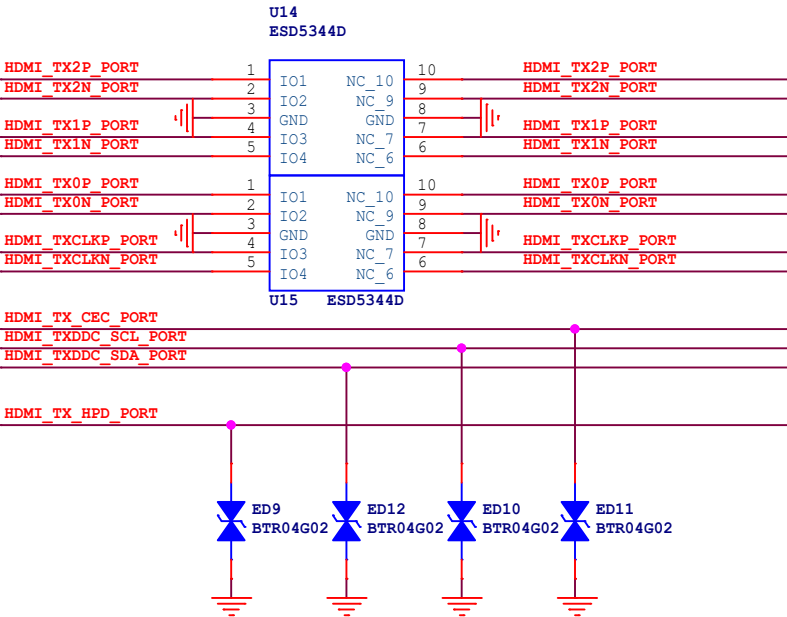
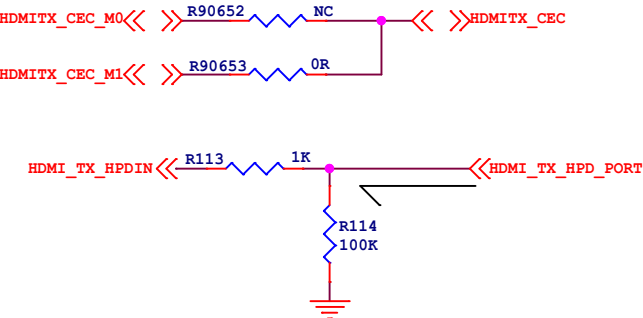
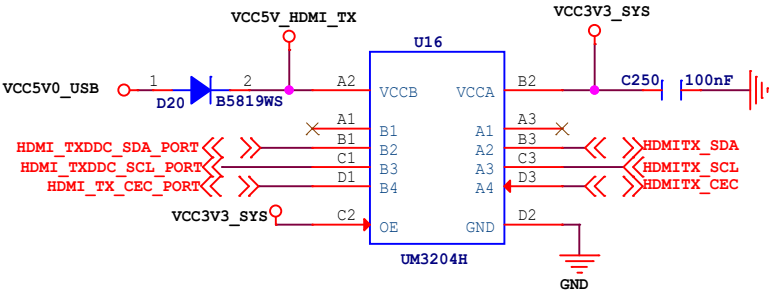
# E KEY\_WIFI/BT\_PCIE2.0



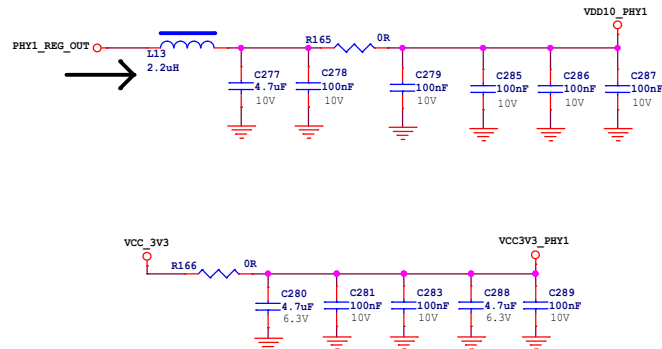
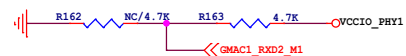
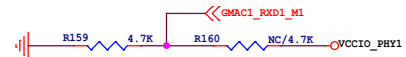
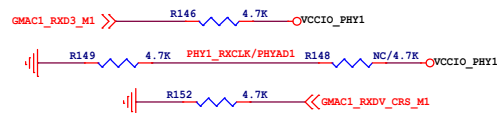
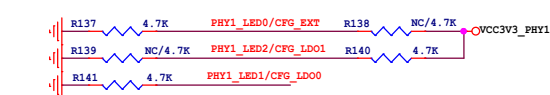
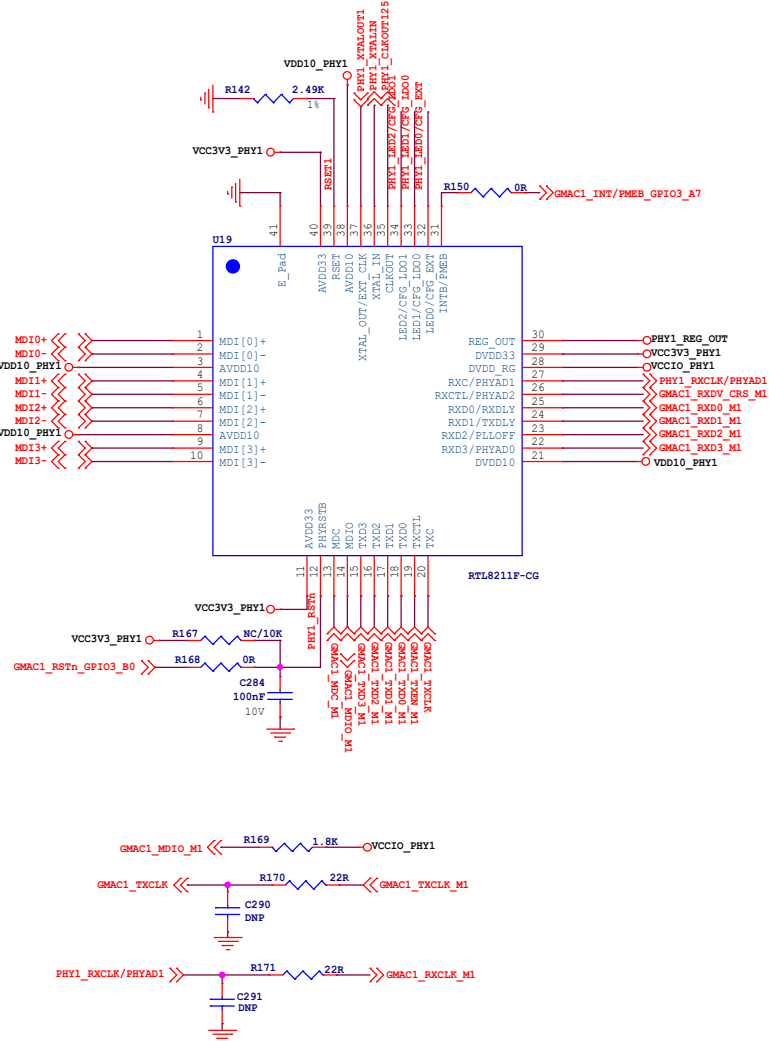
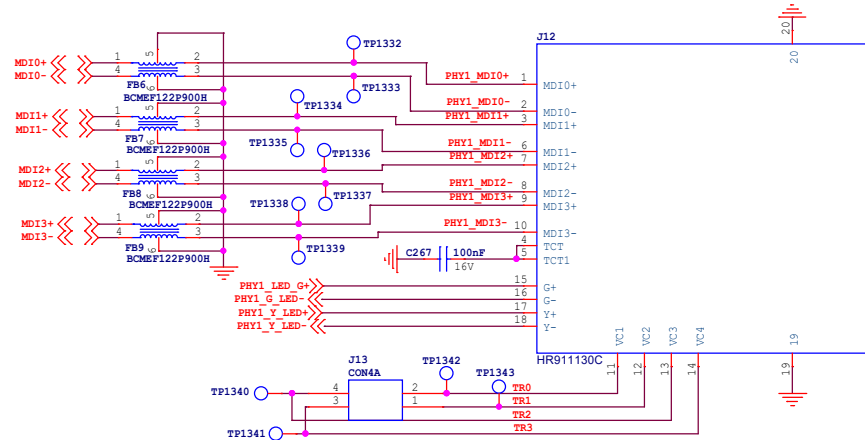
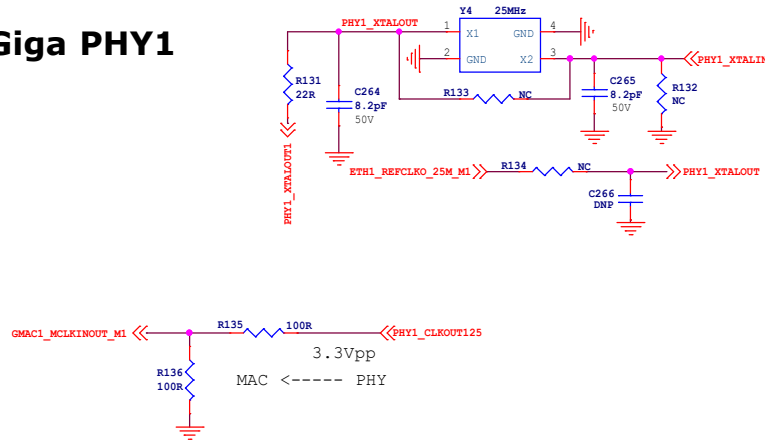
radxa

| Size                                           | Title:                           | REV   |
|------------------------------------------------|----------------------------------|-------|
| A4                                             | Page Name: E KEY_WIFI/BT/PCIE2.0 | V1.31 |
| Date: Tuesday, October 18, 2022 Sheet 18 of 27 |                                  |       |

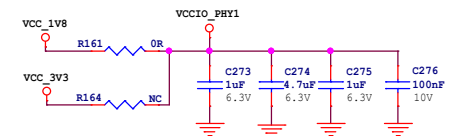
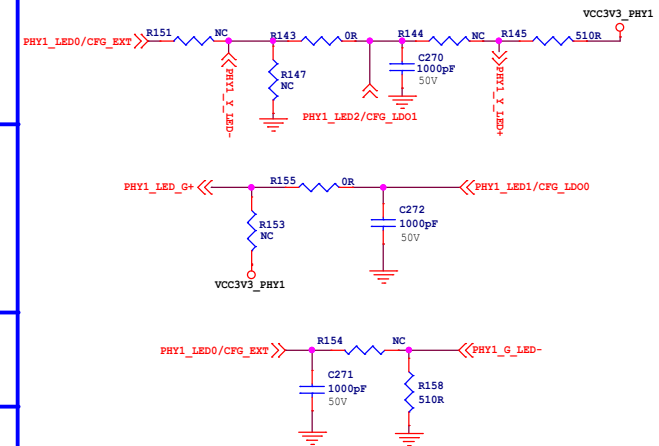
HDMI2.0 TX



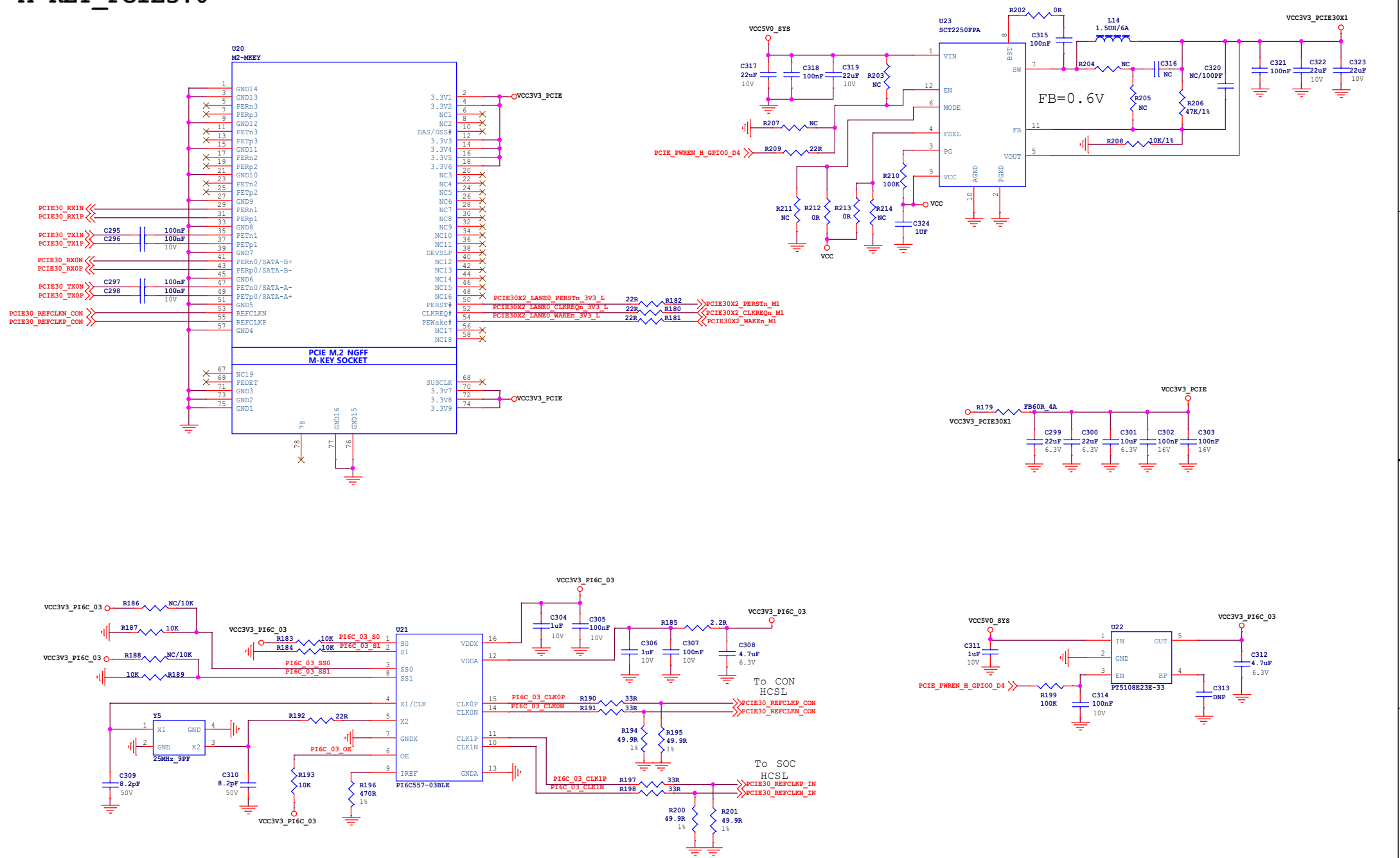
## Giga PHY1



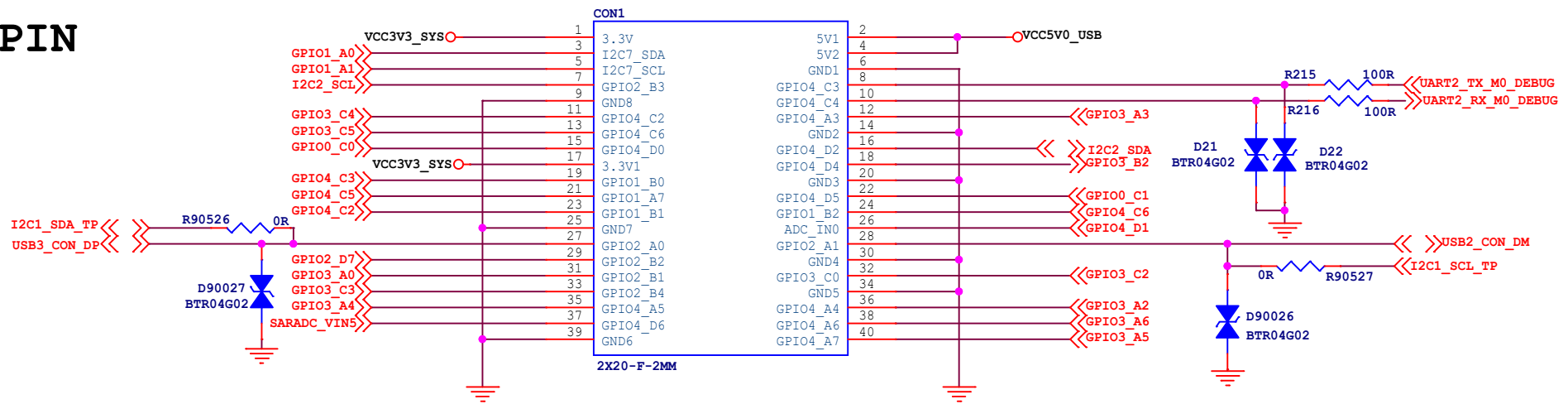
| RGMII Power Source     | CFG_EXT | CFG_LDO[1:0] |  |
|------------------------|---------|--------------|--|
| External 3.3V          | 1'b1    | 2'b00        |  |
| External 1.8V          | 1'b1    | 2'b10        |  |
| Internal 1.8V(default) | 1'b0    | 2'b10        |  |



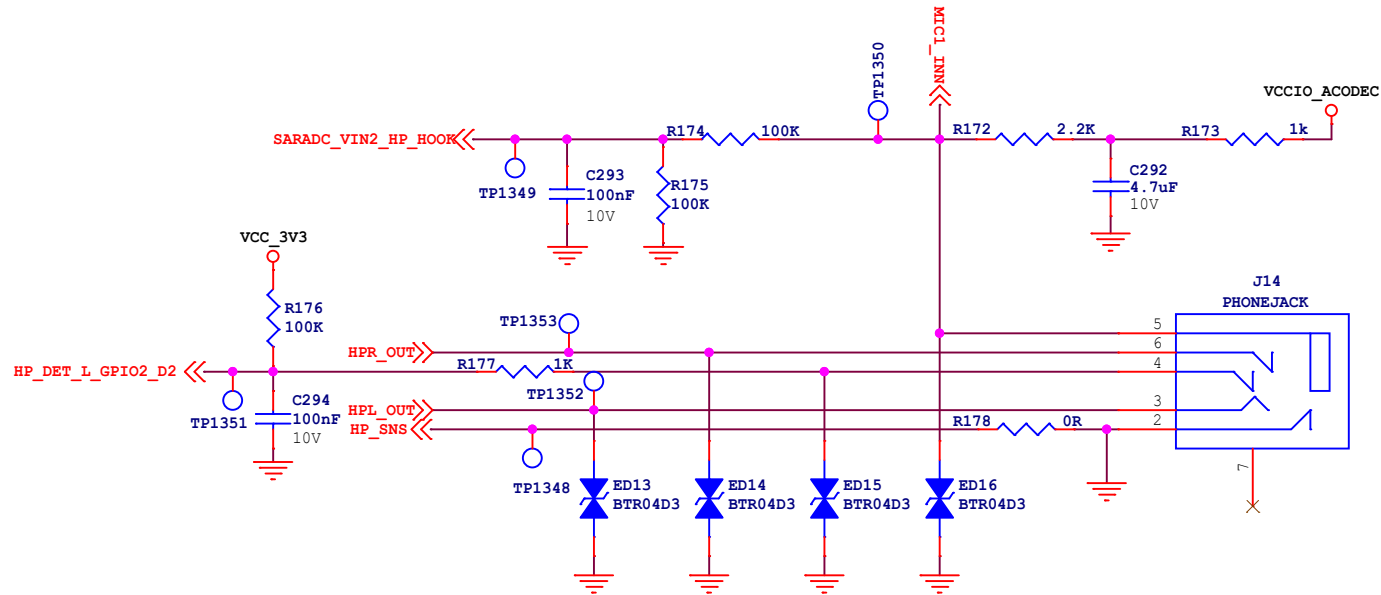
M KEY\_PCIE3.0



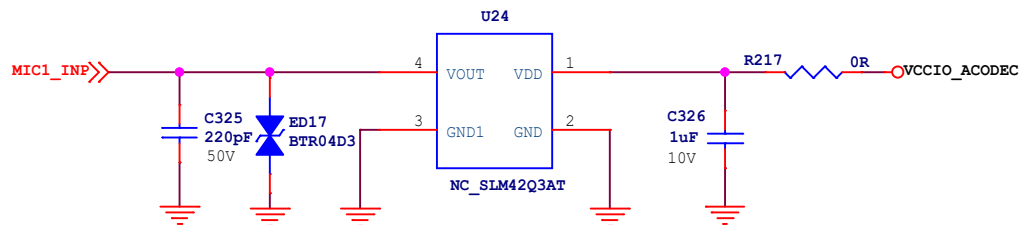
# 40PIN



# PHONE



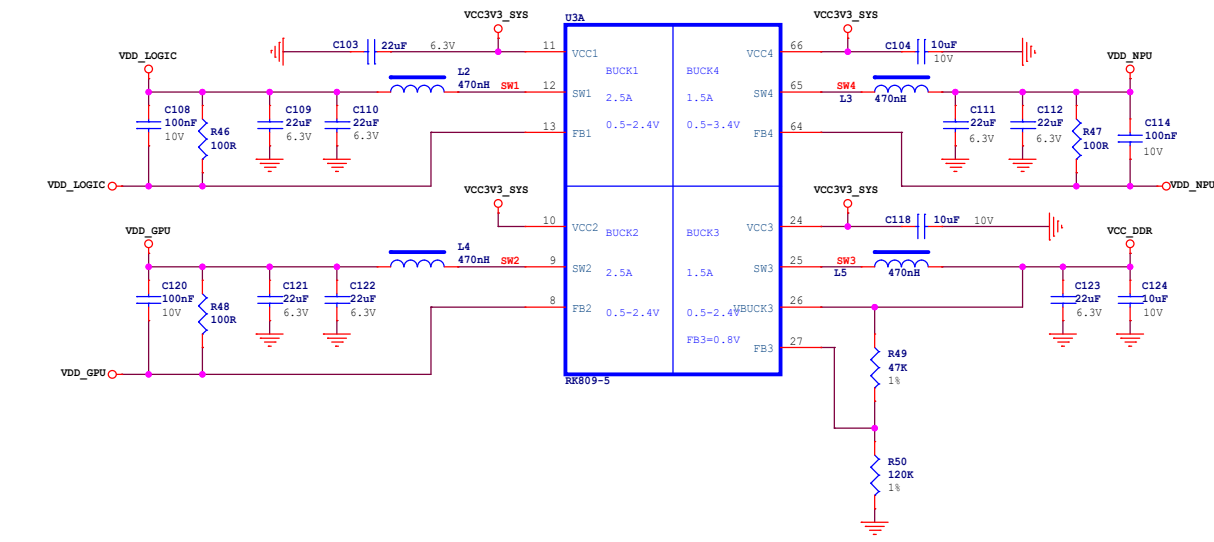
# MIC



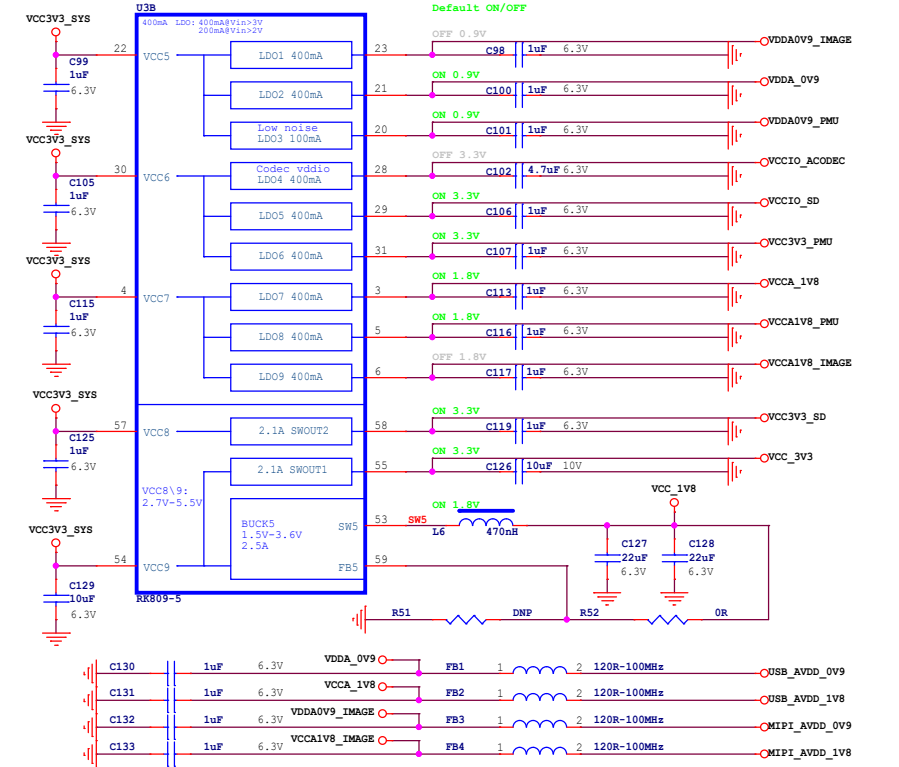
radxa

|                                 |                           |       |
|---------------------------------|---------------------------|-------|
| Size                            | Title: ROCK 3A            | REV   |
| A4                              | Page Name: Phoe/MIC/40pin | V1.31 |
| Date: Tuesday, October 18, 2022 | Sheet 22                  | of 27 |

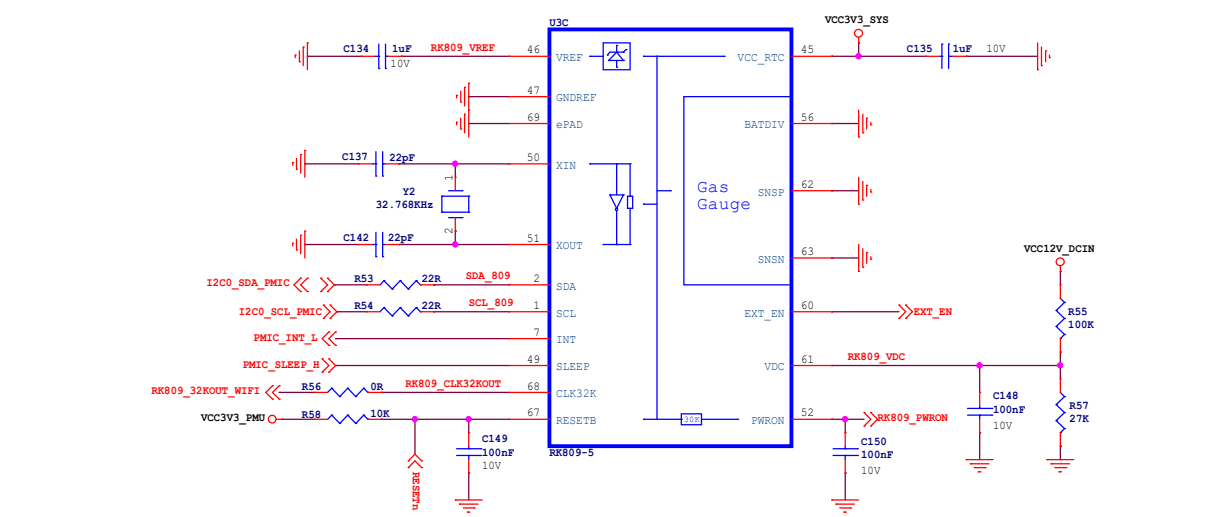
PMIC RK809 DCDC



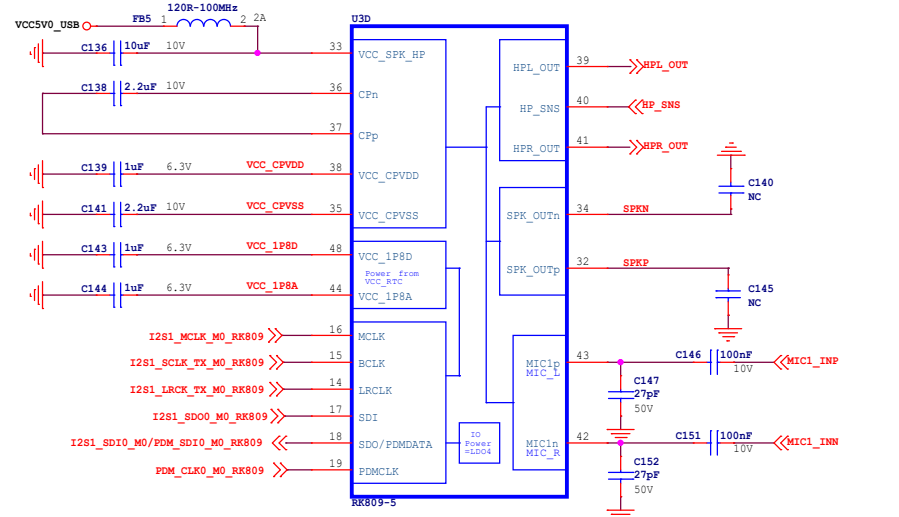
PMIC RK809 LDO



PMIC RK809 Managerment

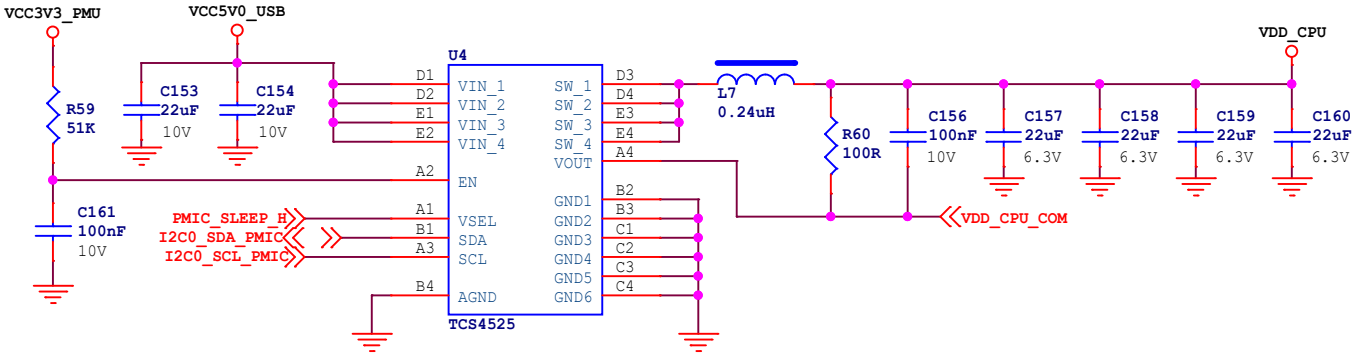


PMIC RK809 CODEC

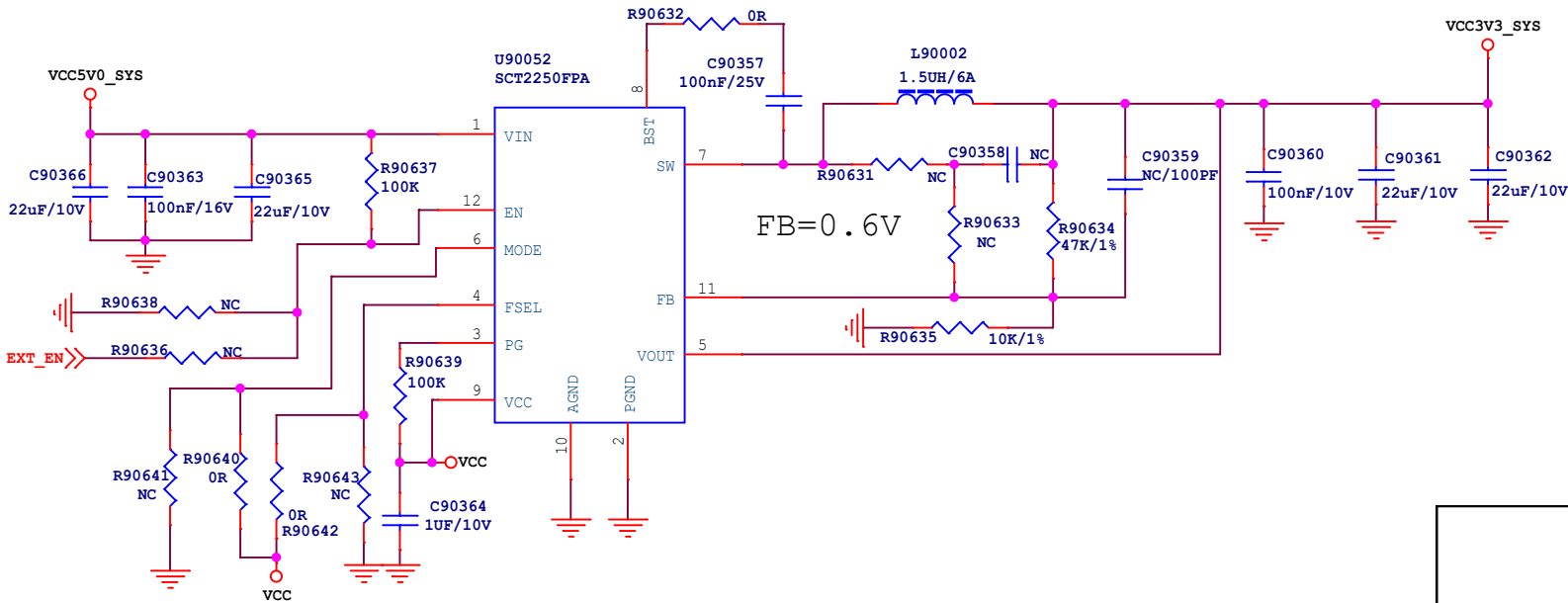


|       |                           |            |          |
|-------|---------------------------|------------|----------|
| Size  | Title:                    | ROCK 3A    | REV      |
| A3    | Page Name:                | Power_PMIC | V1.31    |
| Date: | Tuesday, October 18, 2022 | Sheet      | 23 of 27 |

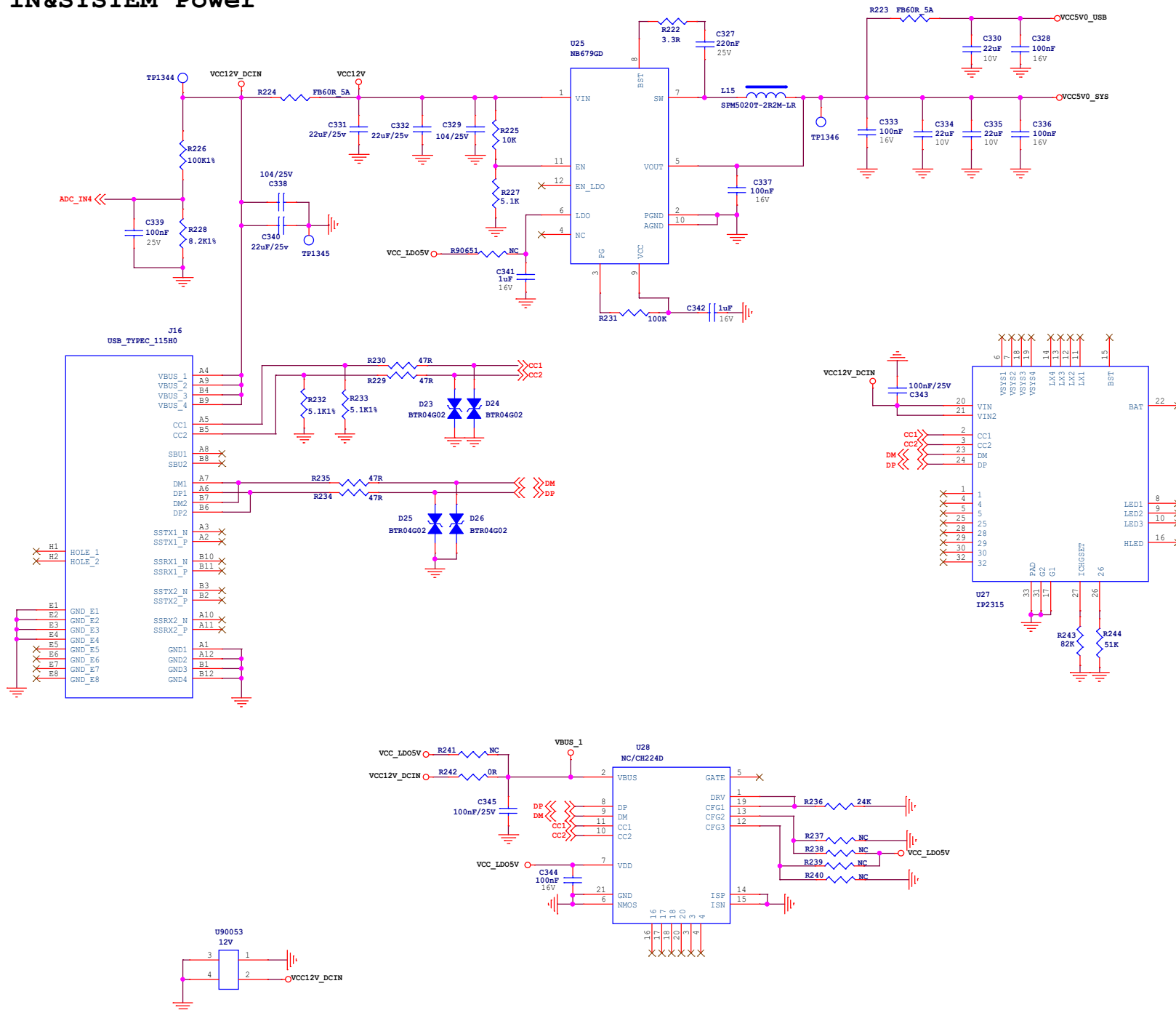
VDD\_CPU



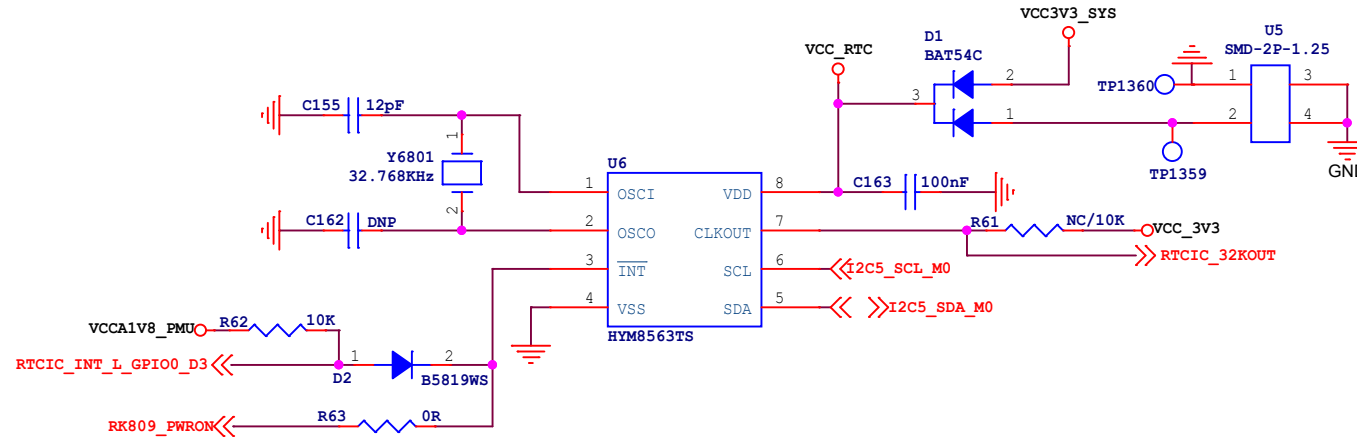
VCC3V3\_SYS



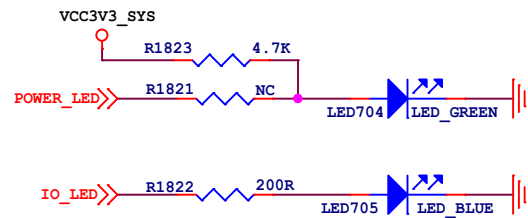
# DC IN&SYSTEM Power



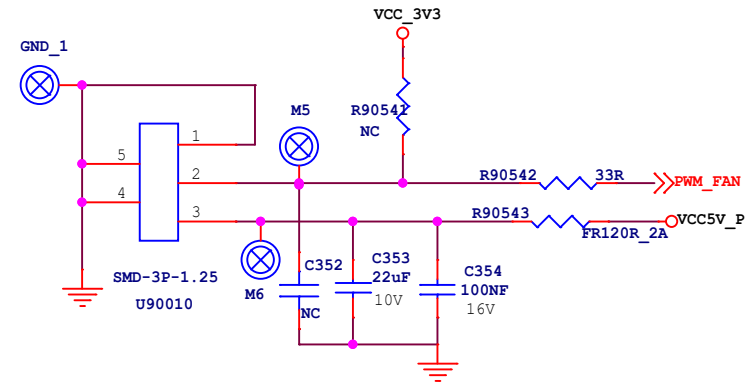
# RTC



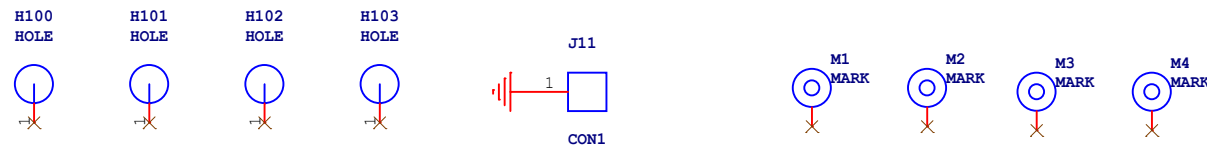
## LED



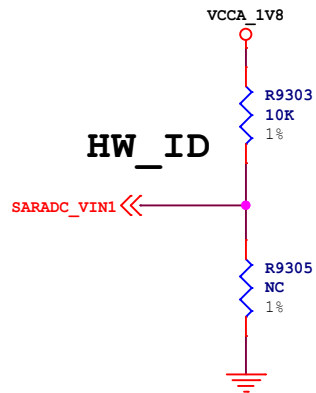
**FAN**



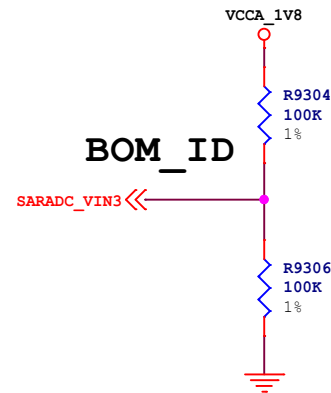
# HOLE



|                                 |                             |                |
|---------------------------------|-----------------------------|----------------|
| Size<br><br>A4                  | Title: ROCK 3A              | REV            |
|                                 | Page Name: RTC/FAN/LED/HOLE | V1.31          |
| Date: Tuesday, October 18, 2022 |                             | Sheet 26 of 27 |

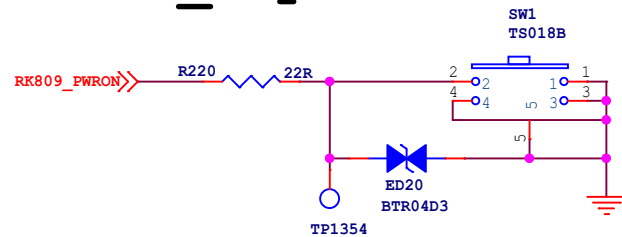


| SARADC_VIN1 | Up Resistance | Down Resistance |
|-------------|---------------|-----------------|
| HW_ID0      | 10K           | DNP             |
| HW_ID1      | 10K           | 110K            |
| HW_ID2      | 20K           | 100K            |
| HW_ID3      | 33K           | 100K            |
| HW_ID4      | 18K           | 36K             |
| HW_ID5      | 36K           | 51K             |
| HW_ID6      | 51K           | 51K             |
| HW_ID7      | 51K           | 36K             |
| HW_ID8      | 36K           | 18K             |
| HW_ID9      | 100K          | 33K             |
| HW_ID10     | 100K          | 20K             |
| HW_ID11     | 110K          | 10K             |
| HW_ID12     | DNP           | 10K             |

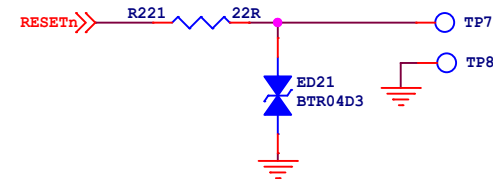


| SARADC_VIN3 | Up Resistance | Down Resistance |
|-------------|---------------|-----------------|
| G           | 10K           | DNP             |
| A           | DNP           | 100K            |
| B           | 100K          | 20K             |
| C           | 100K          | 51K             |
| D           | 100K          | 100K            |
| E           |               |                 |
| F           |               |                 |
| NC          | DNP           | DNP             |
| I           | 20K           | 100K            |
| J           | 18K           | 36K             |
|             |               |                 |
|             |               |                 |
|             |               |                 |

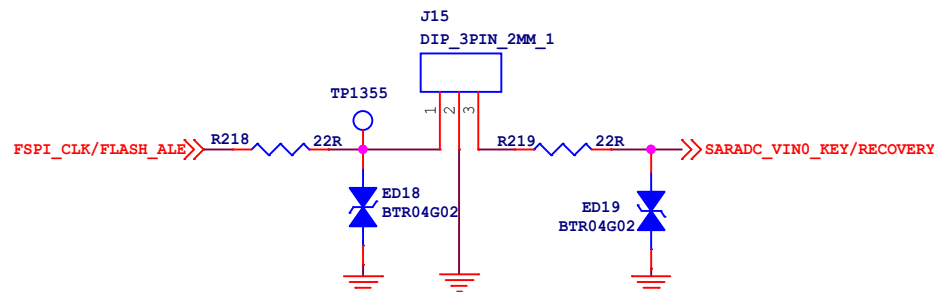
## PowerOn/OFF\_Key



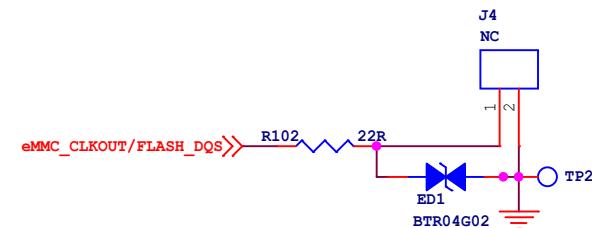
## Reset\_Key



## RECOVERY



## Maskrom



radxa